

PACIFIC GAS AND ELECTRIC COMPANY

Gas Operations Support Team

Data Response

Please note that the Picarro Projects prior to 2014 were proof of concept of the Picarro Surveyor technology. The surveys were not used for compliance purposes, or for associated bundled repairs, until the 2014 Leak Optimization Pilot Program. Three pilots have been performed in 2014 as follows:

- Pilot 1 = East Bay Division in the City of Oakland in January
- Pilot 2 = Sacramento Division in the City of Sacramento in February
- Pilot 3 = Sacramento Division in the City of Sacramento and neighboring towns in March

Responses to the questions below include totals for all three Pilots, as well as the breakdown by each Pilot.

QUESTION(S) 4806.41: On average, how many man-hours (including travel time and labor) do you currently spend to identify a leak? Please provide your calculations.

RESPONSE(S) 4806.41: PG&E measures leak survey productivity in terms of the number of services surveyed, rather than leaks found. The table below depicts the average man-hours for performing leak survey using the Picarro technology, including foot survey where the Picarro technology identifies a possible leak.

Pilot Totals						
MAT*	MAT Description	Unit Description		Recorded Man-Hours	Average Hrs/Unit	Average Srvcs/Hr
<i>Calculation: $b \div a = c$</i>			<i>a</i>	<i>b</i>	<i>c</i>	<i>1 \div c</i>
DEF	Picarro Rollout – Routine Survey	Services Surveyed	36,648	3,432	0.09	11
Leaks Found			Units	Recorded Man-Hours	Average Hrs/Unit	Average Srvcs/Hr
line	<i>Calculation: $b \div a = c$</i>		<i>a</i>	<i>b</i>	<i>c</i>	<i>na</i>
1	Picarro Rollout – Routine Survey	Distribution Leaks	1,261	na	na	na
2	Picarro Rollout – Routine Survey	Meter Set Leaks	1,556	na	na	na
<i>(1+2) = Total Leaks</i>			2,817	3,432	1.2	na

Notes: 2014 TYD results week of 4/21/2014

*PG&E tracks Picarro Routine Survey under Maintenance Activity Types (MAT) DEF.

Pilot 1 East Bay Division in the City of Oakland						
MAT	MAT Description	Unit Description		Recorded Man-Hours	Average Hrs/Unit	Average Srvcs/Hr
<i>Calculation: $b \div a = c$</i>			<i>a</i>	<i>b</i>	<i>c</i>	<i>1 \div c</i>
DEF	Picarro Rollout – Routine Survey	Services Surveyed	6,707	992	0.15	7
Leaks Found			Units	Recorded Man-Hours	Average Hrs/Unit	Average Srvcs/Hr
line	<i>Calculation: $b \div a = c$</i>		<i>a</i>	<i>b</i>	<i>c</i>	<i>na</i>
1	Picarro Rollout – Routine Survey	Distribution Leaks	169	na	na	na
2	Picarro Rollout – Routine Survey	Meter Set Leaks	257	na	na	na
<i>(1+2) = Total Leaks</i>			426	992	2.3	na

Note: 2014 TYD results week of 4/21/2014

Pilot 2 Sacramento Division in the City of Sacramento						
MAT	MAT Description	Unit Description		Recorded Man-Hours	Average Hrs/Unit	Average Srvcs/Hr
Calculation: $b \div a = c$			a	b	c	$1 \div c$
DEF	Picarro Rollout – Routine Survey	Services Surveyed	12,010	1,131	0.09	11
Leaks Found			Units	Recorded Man-Hours	Average Hrs/Unit	Average Srvcs/Hr
line	Calculation: $b \div a = c$		a	b	c	na
1	Picarro Rollout – Routine Survey	Distribution Leaks	520	na	na	na
2	Picarro Rollout – Routine Survey	Meter Set Leaks	608	na	na	na
(1+2) = Total Leaks			1,128	1,131	1.0	na

Note: 2014 TYD results week of 4/21/2014

Pilot 3 Sacramento Division in the City of Sacramento						
MAT	MAT Description	Unit Description		Recorded Man-Hours	Average Hrs/Unit	Average Srvcs/Hr
Calculation: $b \div a = c$			a	b	c	$1 \div c$
DEF	Picarro Rollout – Routine Survey	Services Surveyed	17,931	1,309	0.07	14
Leaks Found			Units	Man-Hours Recorded	Average Hrs/Unit	Average Srvcs/Hr
line	Calculation: $b \div a = c$		a	b	c	na
1	Picarro Rollout – Routine Survey	Distribution Leaks	572	na	na	na
2	Picarro Rollout – Routine Survey	Meter Set Leaks	691	na	na	na
(1+2) = Total Leaks			1,263	1,309	1.0	na

Note: 2014 TYD results week of 4/21/2014

QUESTION(S) 4806.42: On average, what does it currently cost (including travel time, labor and materials) to identify a leak? Please provide your calculations.

RESPONSE(S) 4806.42: PG&E measures leak survey productivity in terms of the number of services surveyed, rather than leaks found. The table below depicts the average cost for performing leak survey using the Picarro technology, including foot survey where the Picarro technology identifies a possible leak.

Pilot Totals					
MAT	MAT Description	Unit Description	Units	Recorded Costs	Average \$/Unit
Calculation: $b \div a = c$			a	b	c
DEF	Picarro Rollout – Routine Survey	Services Surveyed	36,648	\$643,777	\$18
Unit Description			Units	Recorded Costs	Average Hrs/Unit
line	Calculation: $b \div a = c$		a	b	c
1	Routine Leak Survey	Distribution Leaks	1,261	na	na
2	Routine Leak Survey	Meter Set Leaks	1,556	na	na
(1+2) = Total Leaks			2,817	\$643,777	\$229

Note: 2014 TYD results week of 4/21/2014

Pilot 1 East Bay Division in the City of Oakland					
MAT	MAT Description	Unit Description	Units	Recorded Costs	Average \$/Unit
Calculation: $b \div a = c$			a	b	c
DEF	Picarro Rollout – Routine Survey	Services Surveyed	6,707	\$215,443	\$32
Unit Description			Units	Recorded Costs	Average Hrs/Unit
line	Calculation: $b \div a = c$		a	b	c

1	Routine Leak Survey	Distribution Leaks	169	na	na
2	Routine Leak Survey	Meter Set Leaks	257	na	na
(1+2) = Total Leaks			426	\$215,443	\$506

Note: 2014 TYD results week of 4/21/2014

Pilot 2 Sacramento Division in the City of Sacramento					
MAT	MAT Description	Unit Description	Units	Recorded Costs	Average \$/Unit
Calculation: $b \div a = c$			a	b	c
DEF	Picarro Rollout – Routine Survey	Services Surveyed	12,010	\$198,547	\$17
	Unit Description		Units	Recorded Costs	Average Hrs/Unit
line	Calculation: $b \div a = c$		a	b	c
1	Routine Leak Survey	Distribution Leaks	520	na	na
2	Routine Leak Survey	Meter Set Leaks	608	na	na
(1+2) = Total Leaks			1,128	\$198,547	\$176

Note: 2014 TYD results week of 4/21/2014

Pilot 3 Sacramento Division in the City of Sacramento					
MAT	MAT Description	Unit Description	Units	Recorded Costs	Average \$/Unit
Calculation: $b \div a = c$			a	b	c
DEF	Picarro Rollout – Routine Survey	Services Surveyed	17,931	\$229,788	\$13
	Unit Description		Units	Recorded Costs	Average Hrs/Unit
line	Calculation: $b \div a = c$		a	b	c
1	Routine Leak Survey	Distribution Leaks	572	na	na
2	Routine Leak Survey	Meter Set Leaks	691	na	na
(1+2) = Total Leaks			1,263	\$229,788	\$182

Note: 2014 TYD results week of 4/21/2014

QUESTION(S) 4806.43: On average, how many man-hours (including travel time and labor) do you currently spend to fix a leak? During a meeting with the Picarro Pilot Program team on 2/28/14, the team mentioned that the man-hours (2 person team) required to fix a leak has dropped from 28 hours to 10 hours. Please provide the calculations to support these figures.

RESPONSE(S) 4806.43: The Picarro technology provides a more efficient way of finding leaks, but does not affect the cost of fixing leaks. The comment referenced in Question 43 concerned PG&E's Leak Optimization Pilot Program in Sacramento during Pilot 2, under which PG&E is attempting to capture efficiencies by "bundling" work. The table below provides efficiencies gained during each Pilot of the entire Leak Optimization program, effort-to-date, with average man-hours to fix the bundled leaks by repair and replacements. The calculations are included in the table.

MAT	MAT Desc	PILOT 1			PILOT 2			PILOT 3			YTD		
		Units	Recorded Man-Hours	Hrs / Unit	Units	Recorded Man-Hours	Hrs / Unit	Units	Recorded Man-Hours	Hrs / Unit	Units	Recorded Man-Hours	Hrs / Unit
	Calculation: $b \div a = c$	a	b	c	a	b	c	a	b	c	a	b	c
50G/50M	Svc Replace	38	1767	46.50	95	1,987	20.92	43	716	16.65	176	4,470	25.40
50G	Simple Svc Repl	38	1767	46.50	54	1345.75	24.92	13	342	26.33	105	3,455	32.90
50M	Complex Svc Repl	n/a	n/a	n/a	41	641.25	15.64	30	374	12.46	71	1,015	14.30
FIG	Main Repair	19	785.251	41.33	13	339	26.08	8	140	17.50	40	1,264	31.61
FIH	AG Svc Repair	45	67.995	1.51	255	315.945	1.24	363	397	1.09	663	781	1.18
FIP	BG Svc Repair	10	186.25	18.63	9	95.25	10.58	17	95	5.60	36	377	10.46

Note: 2014 YTD results week of 4/21/2014

QUESTION(S) 4806.44: On average, what does it currently cost (including travel time, labor and materials) to fix a leak? Please provide your calculations.

RESPONSE(S) 4806.44: The table below depicts the costs associated with leak repair performed in each phase of the Leak Optimization program and results are segregated by pilot. The average cost to repair, or replace, the bundled leaks are broken out by MAT code and all associated costs are included as well as the calculations.

MAT	MAT Desc	PILOT 1			PILOT 2			PILOT 3			YTD		
		Units	Recorded Costs	\$/ Unit	Units	Recorded Costs	\$/ Unit	Units	Recorded Costs	\$/ Unit	Units	Recorded Costs	\$/ Unit
	<i>Calculation: b ÷ a = c</i>	<i>a</i>	<i>b</i>	<i>c</i>	<i>a</i>	<i>b</i>	<i>c</i>	<i>a</i>	<i>b</i>	<i>c</i>	<i>a</i>	<i>b</i>	<i>c</i>
50G/50M	Svc Replace	38	512,295	\$13,481	95	514,851	\$5,419	43	151,811	\$3,530	176	1,178,957	\$6,699
50G	Simple Svc Repl	38	512,295	\$13,481	54	353,979	\$6,555	13	72,188	\$5,553	105	938,462	\$8,938
50M	Complex Svc Repl	n/a	n/a	n/a	41	160,873	\$3,924	30	79,622	\$2,654	71	240,495	\$3,387
FIG	Main Repair	19	188,992	\$9,947	13	73,430	\$5,648	8	26,155	\$3,269	40	288,576	\$7,214
FIH	AG Svc Repair	45	18,916	\$420	255	62,946	\$247	363	70,570	\$194	663	152,432	\$230
FIP	BG Svc Repair	10	38,740	\$3,874	9	23,190	\$2,577	17	17,824	\$1,048	36	79,753	\$2,215

Note: Preliminary 2014 YTD results week of 4/21/2014, true costs have not yet settled

QUESTION 4806.45: On average, what does it cost (including travel time, labor and materials) to replace a riser?

RESPONSE(S) 4806.45: The average cost to replace a riser (all associated costs in addition to labor) as part of the bundled repairs during the Leak Optimization Pilot is provided in the table below. Replacement of just risers only occurred in Pilot 1. The calculation is included in the table.

Pilot 1				
Repair Type	Unit Description	Units Completed	Recorded Costs	Average \$/Unit
	<i>Calculation: b ÷ a = c</i>	<i>a</i>	<i>b</i>	<i>c</i>
Replace a Riser	# of Risers Replaced	2	\$4,496	\$2,248

** Preliminary results week of 4/21/2014, true costs may not have yet settled*

QUESTION(S) 4806.46: On average, what does it cost (including travel time, labor and materials) to replace a service line and riser? Internally sleeving the service line with plastic is also considered replacement.

RESPONSE(S) 4806.46: In 2014, PG&E tracks replacing a service line and riser under MATs 50G and 50M. Please see response to Question 44 above.

QUESTION(S) 4806.47: On average, how many man-hours (including travel time and labor) do you currently spend to monitor Non-Hazardous leaks? Please provide your calculations.

RESPONSE(S) 4806.47: The Picarro technology has not been used for monitoring Non-Hazardous leak indications for rechecks. Please see response to Question 4806.29 for total man-hours spent on monitoring non-hazardous leak indications outside of Picarro.

QUESTION(S) 4806.48: On average, what does it currently cost (including travel time, labor and materials) to monitor a Non-Hazardous leak? Please provide your calculations.

RESPONSE(S) 4806.48: The Picarro technology has not been used for monitoring Non-Hazardous leak indications for rechecks. Please see response to Question 4806.30 for total costs spent on monitoring non-hazardous leak indications outside of Picarro.

QUESTION(S) 4806.49: During the years 2011 to 2013 how many leaks did you identify (by year)?

RESPONSE(S) 4806.49: The table below depicts leak indications identified with Picarro technology in 2012 and 2013. During 2012 and 2013, Picarro was being tested as proof of concept and Picarro surveys were *not* part of the compliance survey with bundled repair, as is the case for the 2014 Leak Optimization Pilot. Picarro technology was not used in 2011. The table shows leak indications found by both Picarro

and traditional survey methods. The Incremental Picarro column depicts leak indications found in addition to traditional survey methods with Picarro technology.

Leaks Found Grade	2012			2013		
	Both Traditional and Picarro	Incremental Picarro	Total Picarro	Both Traditional and Picarro	Incremental Picarro	Total Picarro
1		8	8	6	32	38
2+	2	10	12	11	15	26
2	31	72	103	21	59	80
3	30	73	103	58	331	389
Meter Set Leaks	14	243	257	88	781	869
Total	77	406	483	184	1,218	1,402

QUESTION(S) 4806.50: During the years 2011 to 2013 how many leaks did you repair (by year)?

RESPONSE(S) 4806.50: Please see response to Question 4806.32. Leak indications identified with the Picarro technology in 2012 and 2013 were proof of concept and not part of the compliance survey. These leak indications were not bundled for repair and therefore repairs were not tracked separately from the traditional survey leak indications.

QUESTION(S) 4806.51: Do you monitor Non-Hazardous leaks or do you repair them? Please explain your policy.

RESPONSE(S) 4806.51: The 2014 Leak Optimization Pilot for compliance survey with bundled repair does not include monitoring Non-Hazardous leak indications for rechecks. PG&E monitors Non-Hazardous leaks, Grades 2+, 2, and 3's, by rechecking and repairing per Utility Procedure TD Utility Procedure TD-4110P-09 Leak Grading and Response. See attachment "*UP TD-4110P-09 Rev2.pdf*" for the procedure.