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SDG&E RESPONSE
DATE RECEIVED: MARCH 9, 2015
DATE RESPONDED: APRIL 1, 2015

I. POLES

20. In the SCE TY2015 GRC (A13-11-003), SCE indicated that it had performed a stratified survey of just over 5000 wood poles and determined that roughly 20% of its wood poles would fail current pole loading standards. Please indicate, for SDG&E:

    a. What analyses or surveys has SDG&E done of its wood poles to determine their compliance with current pole loading standards?
    b. What percentage of SDG&E's wood poles does SDG&E believe are in compliance with CPUC pole loading regulations because of grandfathering provisions, but would not meet current standards for new poles?
    c. What percentage of SDG&E's poles does it believe are not in compliance with CPUC pole loading regulations?
    d. What measures is SDG&E planning in this cycle to verify pole loading compliance for its wood poles?
    e. What number of pole replacements is SDG&E planning in each year of this GRC cycle to replace poles that are out of compliance with CPUC pole loading regulations?
    f. What number of pole replacements is SDG&E planning in each year of this GRC cycle to replace poles that are in technical compliance with CPUC pole loading regulations, but only because of grandfathering provisions of those regulations, and would otherwise not be in compliance?

SDG&E Response:

a. Program Management coordinated an effort in 2012 and 2013 to run pole loading calculations on select groups of poles. In 2012, Program Management analyzed approximately 1,000 poles and in 2013 approximately 3,400 poles were included in the study.
b. In 2012 and 2013 a survey of a select group of poles was made to assess their vulnerability under recently revised pole loading criteria. That group of approximately 4,400 poles was specifically selected from the High Risk Fire Areas, and within the HRA, from locations thought to have the potential to yield overloaded poles. Poles can become overloaded for a variety of reasons including attachments by third party communications providers under provisions of the Federal Telecommunications Act of 1996 and California CPUC D.98-10-058 Order Instituting Rulemaking on the Commission's Own Motion into Competition for Local Exchange Service. That assessment showed that of those poles surveyed, approximately 15% would not meet the updated current loading requirements. It is important to consider that the sample population surveyed was specifically chosen in the anticipation that it would yield a higher fraction of poles and is not representative of the entire SDG&E distribution system.

Response to Question 20b (Continued)

It was from information such as this that SDG&E embarked firstly on its PoleCARE program, which was then subsumed into the larger FiRM effort.

c. See the answer to part (b) of this question

d. Through the CMP and QC Programs, SDG&E inspectors identify poles that appear to be overloaded. Pole loading calculations are performed on every one of those to determine whether or not the pole is overloaded and what the appropriate corrective action should be. Additionally, through SDG&E's Fire Risk Mitigation (FiRM) program, it is estimated that approximately 75,000 poles in the Fire Threat Zone will be analyzed during the 2016 GRC cycle.

e. SDG&E does not have a planned number of pole replacements that is based on this criteria through CMP/QC.

f. SDG&E does not have a planned number of pole replacements that is based on this criteria through CMP/QC.

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21. In the FiRM workpapers, for each dollar cost amount shown on pp. 756 and 789 of the Exhibit 9 workpapers, please indicate how many pole replacements are expected to be done as part of that cost amount.

SDG&E Response:

This response is in regards to the two FiRM budgets, 13247 and 14247.

In 2013, SDG&E began developing a program to look at pole loading in fire prone areas. As SDG&E progressed in creating the program to address pole loading, the project team scoured through data and determined that overloaded poles were not the only risk in the Fire Threat Zone (FTZ). Based on historical data, splices, connectors, copper conductor, and overloaded poles all appeared to be risks. SDG&E's proposed pole loading program then turned into a more comprehensive risk mitigation program, the FiRM program (officially commenced in 2014). SDG&E has done a tremendous amount of work to reduce risk through operational measures, through fire-hardening, and through the deployment of advanced technology, and the FiRM Program combines all of those efforts, to further reduce the risk of wildfire ignition in high risk areas. In addition, the program will prioritize and address aged conductor, aged splices, overloaded poles, and clearance issues as well as other conditions that are known to be a risk in the FTZ. A pole loading specific program is planned to be scoped in 2016 with 2 years knowledge resulting from working the comprehensive program.

The funding request below considers the more comprehensive approach to reducing risk, rather than a focus specific to poles. Poles however are addressed as part of the comprehensive program.

The following table provides an estimate of poles to be replaced, based on pp. 756 and 789 of the Exhibit 9 workpapers:

FiRM Pole Replacements by Year

Budget Number	**2014**	**2015**	**2016**
13427	621 poles	606 poles	593 poles
14247	674 poles	1520 poles	3354 poles

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II. OTHER

22. With regard to Aldyl-A plastic gas pipe:

    a. Please confirm that SDG&E plans to replace 17 miles of Aldyl-A pipe during this GRC cycle (Ex. 7, p. 16).
    b. Please indicate the total miles of Aldyl-A pipe on SDG&E's system at the end of each year from 2010-14 (actual) and 2015-2016 (forecast).
    c. By what year does SDG&E plan to complete replacement of Aldyl-A pipe on its system?

SDG&E Response:

a. As stated in the Forecast Methodology section of the GRC Capital Workpapers (SDG&E-07 –CWP, pg 28) for SDG&E, the average yearly replacement will be 17 miles for steel and plastic. The ratio for the length of plastic pipe with at least one leak to steel pipe with at least one leak is 34 to 1. Thus, the majority of the 17 miles per year of pipe replacement will be plastic.

b.

End of Year	Miles of Aldyl-A**
2010	*
2011	*
2012	1,643
2013	1,638
2014	1,638
2015	1,633
2016	1,616

*Data is only readily available from 2012 forward given the implementation of the GIS system in 2012.

**The miles of Aldyl-A are derived by using the assumption that any plastic pipe with a year of operation before 1986 is Aldyl-A.

c. The goal of SDG&E is not to replace all Aldyl-A pipe in the system, but rather use a performance based approach to pipe replacement. Thus, a timeline for full replacement of Aldyl-A has not been set.

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II. OTHER

23. With regard to the proposal to defer replacement of aging gas compressors to the next GRC (Ex. 6, pp. 22-23):

    a. Please provide SDG&E's best estimate of the annual rate of methane leakage from its aging compressors.

    b. Please explain why SDG&E believes it is safe and appropriate to defer these replacements to the next GRC.

SDG&E Response:

23a. The table below provides annual methane emissions reported under California Global Warming Solutions Act (AB32) related to the reciprocation compressor packing or centrifugal compressor wet seal venting.

	2012		2013		2014	
	MCF* CH4	MT** CH4	MCF CH4	MT CH4	MCF CH4	MT CH4
Clark #1	576.0	11.1	0.5	0.0	0	0
Clark #2	549.6	10.6	0.35	0.0	0	0
Clark #3	563.2	10.8	0.6	0.0	55.4	1.1
Solar #4	30.0	0.6	4.4	0.1	1.0	0.0
Solar #5	5.0	0.1	2.9	0.1	1.4	0.0
Solar #6	8.9	0.2	9.4	0.2	0.9	0.0
Solar #7	21.0	0.4	1.5	0.0	0.4	0.0
Cooper #8	372.7	7.2	2.9	0.1	22.4	0.4
Cooper #9	37.1	0.8	2.6	0.1	62.6	1.2
Cooper #10	1088.6	21.0	613.6	11.8	664.6	12.8

*MCF – Thousand cubic feet **MT – Metric Tons

23b. SDG&E strives to operate and maintain its equipment to be safe and reliable. The equipment is currently safe to operate. As a prudent operator, SDG&E is requesting in this GRC funds to maintain its compression assets in a safe and reliable operating condition. In this GRC cycle, SDG&E is also requesting funds to undertake preliminary engineering and design of a new or replacement compressor station. The aging of assets presents challenges in locating spare parts, which can create operational issues. As noted in testimony, SDG&E is forward-looking and developing a strategy for the replacement process before the age of the equipment becomes an operating issue. Therefore, SDG&E is not deferring replacement.

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24. SDG&E's testimony indicates that it has 90 miles of unjacketed feeder cable and 1858 miles of unjacketed lateral cable (Ex. 9, p. 93; Ex. 9 workpapers, p. 547), for a total of 1948 miles of unjacketed branch cable (Ex. 9, p. 23). SDG&E further testifies that this unjacketed cable is responsible for 25 percent of all distribution outages (Ex. 9, p. 23), and that 25 percent of its unjacketed cable replacement work is proactive rather than being in reaction to cable failures (Ex. 9, p. 93). With regards to this testimony:

    a. Please confirm that CCUE's reading of SDG&E's testimony as set forth here is correct, and if not provide corrected numbers.
    b. Please provide the overall distribution outage amounts and the unjacketed cable outage amounts for each of the years 2008-14.
    c. For each of the years 2008-14 (actual) and 2015-16 (forecasted), please indicate:

        i. The number of miles of unjacketed lateral cable as of the end of the year;
        ii. The number of miles of unjacketed lateral cable proactively replaced during the year; and
        iii. The number of miles of unjacketed lateral cable replaced after failure during the year.

    d. For each of the years 2008-14 (actual) and 2015-16 (forecasted), please indicate:

        i. the number of miles of unjacketed feeder cable as of the end of the year.
        ii. The number of miles of unjacketed feeder cable proactively replaced during the year; and
        iii. The number of miles of unjacketed feeder cable replaced after failure during the year.

    e. By what year, if any, does SDG&E anticipate having replaced all of its unjacketed lateral cable?
    f. By what year, if any, does SDG&E anticipate having replaced all of its unjacketed feeder cable?
    g. What is the estimated 2016 cost per mile to replace unjacketed feeder cable after a cable failure?
    h. What is the estimated 2016 cost per mile to proactively replace unjacketed feeder cable?
    i. What is the estimated 2016 cost per mile to replace unjacketed lateral cable after a cable failure?
    j. What is the estimated 2016 cost per mile to proactively replace unjacketed lateral cable?

SDG&E Response:

In response to question a, CCUE's reading of SDG&E is testimony is correct. For questions b through j, please see attachment CCUE-SDG&E-DR-02_Supplemental Information tab "CCUE2 24".

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25. For each of the projects identified in SDG&E's capital addition workpapers as a FERC transmission project with associated distribution cost (E.g., Chapter 9 workpapers, pp. 856-935, and possibly others as well), please identify the associated FERC-jurisdictional transmission capital cost of the project for which recovery is not being sought in this GRC.

SDG&E Response:

FERC jurisdictional costs are not within the scope of this proceeding. SDG&E therefore objects to this request as not reasonably tailored to lead to admissible evidence.

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26. With regard to reliability improvements from vegetation management (Ex. 3, p. 5:25; Ex. 10, p. 7:20-22):

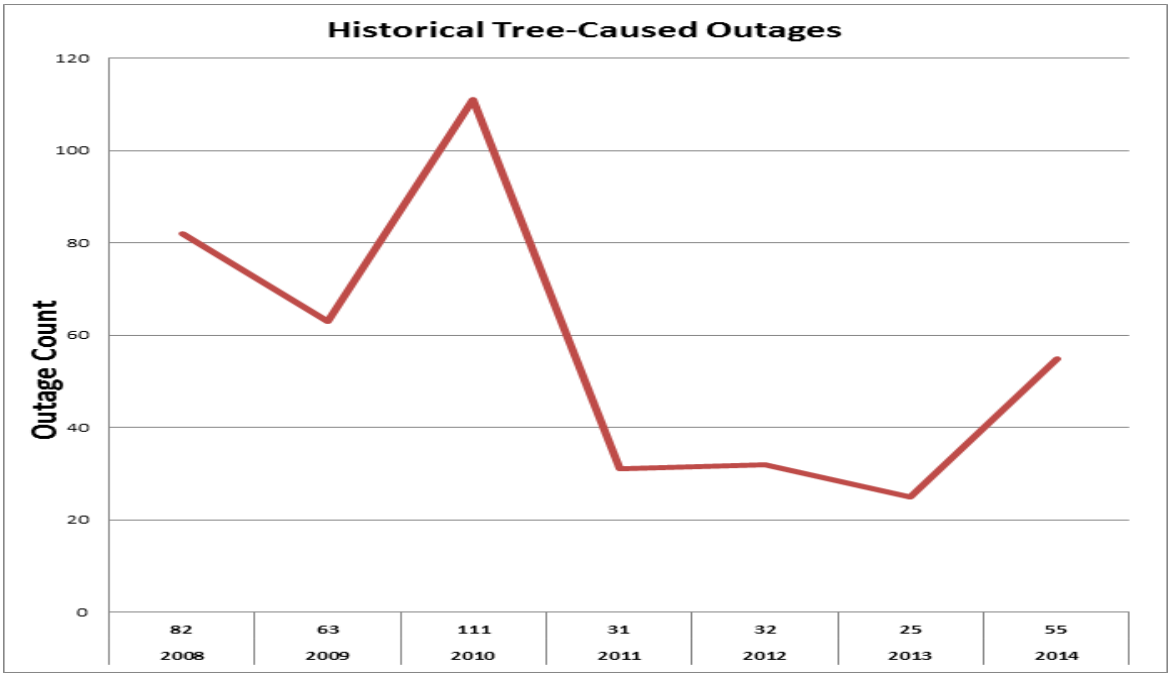
a. Please clarify exactly what categories of outages have been reduced by SDG&E's vegetation management practices.

b. Please provide the annual outage statistics for each year from 2008-14, inclusive, that underlie SDG&E's claim of a 75 percent improvement, and indicate which of those years are the basis for the claim.

SDG&E Response 26:

a. SDG&E has reduced tree related outages impacting Overhead Primary Distribution.

b. The reduction percentage is a result of years 2010 of 111 outages to 2013 of 25 outages thus resulting in just over a 75% reduction in outages.



Please note: In 2014 SDG&E experienced an upward trend in the number of tree caused outages due to two impactful weather events: 1) one in the spring during an especially vigorous Santa Ana which resulted in eleven separate tree-related outages in one single day and, 2) one in the fall where a localized downdraft resulted in six separate tree-related outages in a single day.

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27. SDG&E testifies that it plans to make $31 million of capital expenditures over three years to improve distribution reliability, and $17 million of capital expenditures over three years for the Borrego Springs micro-grid project (Ex. 9, pp. 112-114). Please provide any analyses or other studies by SDG&E showing the expected reduction in SAIDI and/or SAIFI from these capital expenditures, or any subset(s) of them.

SDG&E Response:

Individual projects on the distribution system only affect a specific area related to the project. The estimated $31M plus $17M will only improve a fraction of SDG&E's electrical system. The remainder of the distribution system that does not benefit from capital expenditures has upward pressures. Known upward pressures are from aging infrastructure and from safety efforts. As equipment ages, its failure rate increases. This phenomenon is particularly true with unjacketed cable installed prior to 1983, which is a leading cause of outages at SDG&E. Additionally, year to year variation in outages and weather make it difficult to point to specific explanations for reliability results. In conclusion, one should not expect an exact correlation between the estimated amount of improvement from a project and system wide results.

Regarding general reliability, SDG&E performs a cost-benefit analysis on potential reliability projects. The analysis focuses on the expected reliability improvement for that specific project. A review of previous analyses shows a wide range of expected results for each project. For this discussion, data will be discussed in the context of SAIDI or SAIFI improvement per $1M spent. SAIDI improvements range from 0.1 to 0.6 SAIDI minutes per $1M spent. SAIFI improvements range of 0 to 0.008 SAIFI outages per $1M spent. Without knowing exactly which projects will be chosen, it is difficult to estimate a specific improvement so a range of likely improvements will be given. Assuming that $31M is spent on projects that are of a similar nature to the reviewed historical jobs, the SAIDI improvements would likely be in the 5 to 10 minute range, while SAIFI would be in the 0.005 to 0.015 range. To clarify, these improvements are predicted during the analysis. Because of upward pressures, SDG&E expects improvements to actual system wide results to be somewhat less than the estimated improvements from individual projects.

Next is a discussion of the $17M for Microgrid Systems. As discussed on page 120 of the testimony, the Microgrid Systems for Reliability project is not solely focused on enhancing the Borrego Springs microgrid, but rather, this project also includes the construction of future microgrid projects to "allow pockets of the distribution system to isolate from the rest of the system when a disturbance or contingency situation occurs...". In the case of Borrego Springs, in recent history, there has been an average of 3.2 transmission outages per year for an average of 4 hours per outage. If the enhancements to the Borrego Springs microgrid could reduce the duration of these outages by 50-75%, then the resultant SAIDI improvement would be 0.83-1.25 SAIDI minutes. This is determined by the calculation: SAIDI Benefit = 3.2 (TR outages per year) *120 minutes (or 180) * 3031 (Borrego Customers) / 1.4 mil (SDG&E Customers). It should be noted that the number and duration of transmission outages in the future is unknown. The above calculation is an estimate of improvement based on the recent history of outages. SDG&E has not performed such analysis for other microgrids as the exact locations have not yet been identified.

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28. Please confirm that SDG&E is not requesting any increase in either funding (beyond inflation) or staffing for troublemen, as apparently indicated by Ex. 10, pp. 16-17.

SDG&E Response 28:

SDG&E is requesting incremental funding for additional troubleshooters due to system growth. Please see Ex 10 pp17 where it reads:

The Base Year recorded plus incremental increases methodology was utilized to identify need for additional Troubleshooting personnel in the field due to system growth.

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29. SDG&E indicates that new training programs will be needed because of demographic considerations (Ex. 10, pp. 22, 28-29). Please provide:

    a. Any SDG&E studies or analyses of the changing demographics of its workforce which underlie its need for new or expanded training programs.
    b. An explanation of whether it is correct, and if so why, that development of training programs will apparently require 8 FTEs for 3 years (Ex. 10, p. 25, indicating 49,000 hours for program development; 49,000 hours spread over the three-year duration of the GRC equates to 16,000+ hours/year, or 8+ FTEs each year).

SDG&E Response 29:

a. Demographic considerations are not a driver for the new training programs of this work activity.

b. The re-design of existing training programs or the development of new training where none exists is a major task, requiring significant resources. It takes time and resources to properly analyze training needs, design the training solution and then develop (build) the training solution.

   The industry standard for planning and budgeting training resources is to calculate the number of "development" hours needed to produce one hour of "delivered" training. The American Society for Training & Development (ASTD) publishes estimates for development hours and updates these estimates every five to six years. These estimates vary based on the type of training being built. The estimates will vary even further based on the complexity of the training.

   The current (2009) ASTD ranges estimate that for every hour of Instructor-Led training the development hours will range from a low of 43 hours to a high of 189 hours. Their estimates for E-training (web-based or computer-based) range from 93 to 243 hours of development for every hour of delivered training.

   SDG&E's training project will require 49,000 hours of development and will yield over 1,600 hours of deliverable training. Based on our experience with training development, we expect to average 30 hours of development for every one hour of training. Our development ratio will range from 15 hours to 50 hours depending on the job classification involved. This ratio will vary based on the training topic, the condition of the current training, the impact of technology and change to the job classification, and the job classification itself.

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30. For workers who are available to respond to electrical outages, please indicate:

    a. What broad job categories do those workers fall into (e.g., lineman, troubleman, trainee, etc.);
    b. For each category listed, what was the year end head count for that category for each of the years 2005-14, inclusive; and
    c. For each category listed, and for all categories cumulatively, what is the total number of employees SDG&E considers available to respond to electrical outages, as of each of the years 2005-14, inclusive.

SDG&E Response 30:

YEAR-END ACTIVE HEADCOUNT

Job Title	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Fault Finding Specialist	6	5	6	5	6	6	6	5	5	6
Lineman	246	254	263	272	259	252	247	237	220	206
Troubleshooter	42	43	43	40	42	41	42	42	42	39
Working Foreman	48	44	46	45	47	43	50	44	44	43
Grand Total	**342**	**346**	**358**	**362**	**354**	**342**	**345**	**328**	**311**	**294**

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31. For each category of worker identified in response to part (a) of the previous question, please provide:

a. The number of workers in that category as of 12/31/14, by worker age (e.g., 50 linemen aged 64, 35 aged 63, 22 aged 62, and so on).
b. The number expected to be eligible for retirement during 2016.
c. The number expected to retire during 2016.
d. The number of replacements expected to be hired during 2016.
e. The expected headcount at the beginning and end of 2016.
f. Any ongoing SDG&E programs or other efforts to deal with the demographic impacts of an aging workforce.
g. Any SDG&E studies of aging workforce issues that addresses any of the categories of workers asked about in this question.

SDG&E Response 31:

a.

WORKERS BY AGE AS OF 12/31/2014

JOB TITLE	<30	30-39	40-49	50-54	55-59	60	61	62	64	66	68	69	70	Grand Total
Fault Finding Specialist				1	4				1					6
Lineman	19	104	51	12	12	2		5	1					206
Troubleshooter		1	11	4	12			5	2	3	1			39
Working Foreman		4	5	5	20	4	1	1				2	1	43
Grand Total	**19**	**109**	**67**	**22**	**48**	**6**	**1**	**11**	**4**	**3**	**1**	**2**	**1**	**294**

b. Based on the minimum age of 55 and 5 years of service, 77 employees will be eligible to retire. However, SDG&E's average retirement age is 62.

RETIREMENT ELIGIBLE 2016*

JOB TITLE	TOTAL
Fault Finding Specialist	5
Lineman	20
Troubleshooter	23
Working Foreman	29
Grand Total	**77**

*Age 55 + 5 Years of Service

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SDG&E Response 31:-Continued

c. Assuming retirements will occur at age 62 and beyond, SDG&E estimates that 22 employees may retire.

EXPECTED TO RETIRE 2016*

JOB TITLE	TOTAL
Fault Finding Specialist	1
Lineman	6
Troubleshooter	11
Working Foreman	4
Grand Total	**22**

*Age 62 and retirement eligible

d. Plans are currently being evaluated.

e. Assuming 22 retirements and the addition of 2 Apprentice classes (24 total), SDG&E would expect to have 296 employees at the beginning of 2016.

EXPECTED 2016 HEADCOUNT

Job Title	Headcount	Less Expected Retirements	*Additions	Expected 2016 HC
Fault Finding Specialist	6	-1		5
Lineman	206	-6	24	224
Troubleshooter	39	-11		28
Working Foreman	43	-4		39
Grand Total	**294**	**-22**	**24**	**296**

*2 Apprentice Classes (2*12 = 24)

SDG&E Response 31:-Continued

f. SDG&E's programs and efforts include:

- **Hiring Strategies**
  - College Recruiting: We have robust college recruiting programs for Engineering, Accounting & Finance, and IT. The program includes rotations around the Company as well as an assigned mentor to help them succeed.

  - Partnerships with the Community: A key component that contributes to our successful diversity hiring is building relationships and networking

    with diverse organizations that strive to develop a pipeline of qualified minority, female, veteran and disabled qualified candidates. A few of the ways we support them are by supporting their programs, participating in their conferences, hosting their meetings, providing speakers at their events and helping to build their networks. Additionally, we leverage their membership for candidate sourcing. We also support several military organizations and programs that assist transitioning veterans such as SDSU's Troops to Engineers Program and local military outplacement center.

- **Training Programs**
  All employees are encouraged to participate in training and development programs so they can advance to positions that require more advanced skill sets and technological knowledge.

  - Job Skills: Job Skills training is offered for entry level positions such as Laborers and Energy Service Specialist. Laborer training includes a three week orientation of their tools. The Energy Service Specialist training is comprised of 16 weeks and of that, 7-8 weeks are taking live calls.

  - Apprenticeship Programs: We have Apprenticeship Programs to become a Lineman, Electrician, Welder or Distribution System Operator. These programs are generally three years, and can include night time school work in addition to on-the-job-training. These are union positions and selection to participate is done following the bargaining unit rules.

SDG&E Response 31:-Continued

- Management Training Courses: We have a number of developmental and training courses:
  - for union employees interested in moving into a management position.
  - for new supervisors to learn critical skills to their new role.
  - for managers, directors and executives to more rigorously develop their leadership and communication skills as well as their financial acumen.

- **Developing Future Workforce**
  - Partner with local community, business, and educational organizations to provide vocational training opportunities. An example of this would be our partnership with the "Construction Tech Academy" at Kearny High School. Through this effort, we help educators learn about our industry by offering

    them internships through the summer. SDG&E employees serve as mentors and project advisors for student projects throughout the school year.

  - Energy and Utility Careers Awareness: We work to create a greater awareness of the job and career opportunities that exist at the utilities. An example of this is Careers in Energy Week which helps reinforce the viable opportunities around STEM curriculum within the energy industry through contests and challenges.

g. SDG&E has not performed any recent studies of aging workforce issues.

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32. Please provide SDG&E's electrical customer count as of June 30 and December 31 of each year from 2005-14, inclusive, and (on a forecast basis) for 2015 and 2016.

SDG&E Response 32:

SDG&E maintains official customer count records at the end of each year. SDG&E's definition of a customer is one meter, although that meter may serve multiple persons. The data is shown in the table below.

Year	System Customers
2005	1,329,196
2006	1,346,759
2007	1,356,580
2008	1,364,487
2009	1,371,796
2010	1,379,872
2011	1,389,025
2012	1,400,024
2013	1,406,947
2014	1,416,105

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33. With regard to SDG&E's proposals for performance incentives (Ex. 10, pp. 80 et seq.):

a. Please provide a listing of the 10 worst performing circuits for SAIDI in each of the years 2009-14, inclusive.
b. For each of the circuits identified in the previous response, please provide its SAIDI performance in each of the other years between 2009 and 2014 in which it was not one of the 10 worst performing circuits.
c. Please provide a listing of the 10 worst performing circuits for SAIFI in each of the years 2009-14, inclusive.
d. For each of the circuits identified in the previous response, please provide its SAIFI performance in each of the other years between 2009 and 2014 in which it was not one of the 10 worst performing circuits.
e. To the extent any of the circuits identified in parts (a) and (b) of this question are located in the Borrego Springs area, please indicate how their SAIDI and SAIFI performance is expected to improve as a result of SDG&E's proposals for that area (Ex. 9, pp. 112-113).
f. If none of the circuits identified in parts (a) and (b) of this question are in the Borrego Springs area, please reconcile that fact with the assertion that Borrego Springs-area circuits are among SDG&E's worst-performing (Ex. 9, pp. 112-113)
g. Please provide any SDG&E projections of the company-wide SAIDI and SAIFI that it expects in each of the years 2016-18 if its requests in this GRC are approved.
h. Please provide any analysis or other written documents in SDG&E's possession addressing the causes for the worsening of SAIDI and SAIFI performance in the last few years.
i. Please provide SDG&E's company-wide SAIDI and SAIFI for 2014, with and without major events excluded.
j. Please explain how SDG&E reconciles its proposal to reset SAIDI and SAIFI performance targets based on the most recent five years of historical data with its (adopted) proposal in the 6/6/14 Joint Petition of CCUE and SDG&E for an Annual Improvement Factor of 1 percent per year, beginning in the second year of a PBR period.
k. Does SDG&E consider its PBR proposal for 2016 to be the second year of the PBR which is currently in effect for 2015? If not, why not?

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SDG&E Response 33:

a. The term "worst performing circuits for SAIDI" will be interpreted using the methodology that was put in place for Performance Based Ratemaking. For the purposes of calculating Worst Circuit SAIDI and Worst Circuit SAIFI the customers on each distribution circuit were considered as the customer pool in the calculations. This methodology is different than the normal calculation of SAIDI and SAIFI which uses the system customers to calculate those indices.

The circuits that had the highest Worst Circuit SAIDI for each of the years requested is shown below.

The request to identify circuits on an annual basis differs from the methodology that SDG&E uses to identify the circuits for the Worst Circuit SAIDI - which determines the circuits from the previous 5 years data. Consequently, not all circuits shown in this response are related to those in the Worst Circuit SAIDI list that SDG&E uses for PBR.

In the table below, the ten circuits with the worst Circuit SAIDI (on an annual basis) are shown. They are ranked by the Worst Circuit SAIDI value.

	2009	2010	2011	2012	2013	2014
1	CTL1	221	448	212	172	79
2	DV1	172	RD1	1215	170	440
3	350	SL1	440	444	171	CTL1
4	283	SE4	QN1	166	222	73
5	66	OK1	217	445	PE1	220
6	353	MOR1	486	79	1215	221
7	440	780	433	HL1	BA2	78
8	171	157	79	172	DV1	442
9	221	444	146	582	440	444
10	MV1	LV2	RA1	170	MF1	1215

b. As mentioned above in the response to 33a, SDG&E does not consider which circuits belong in the Worst Circuit SAIDI group on an annual basis. However, the table below shows the annual value for Worst Circuit SAIDI for all circuits that appear in the response to 33a, with their amount of Worst Circuit SAIDI for each year.

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The grayed cells represent the ten Worst Circuits. If under a year column, the grayed cell represents that the circuits was among the top 10 Worst Circuits that year. When the grayed cell appears under the circuit list, it represents the 10 circuits that were identified in the 2015 PBR as the Worst Circuits – which is the average across 2009-2013. To be clear, only those circuits that are colored gray in the leftmost column are part of the PBR for Worst Circuit SAIDI.

Circuit	2009	2010	2011	2012	2013	2014
66	562	104	148	3	27	87
73	126	28	285	129	138	1016
78	183	34	6	49	244	863
79	424	399	583	924	264	1336
146	326		563			
157	367	735	371	254	315	410
166		2	100	1006	275	7
170	36	534	277	590	2880	77
171	500	332	115	27	2249	55
172	348	1052	383	774	3011	90
212	311	547	264	1362	294	2
217	260	126	660	213	533	230
220	233	59	127	118	81	949
221	473	1341	148	397	186	940
222	344	322	140	136	1219	206
283	779	36		300	275	40
350	990	68	153	280	46	118
353	558	28	295	121	74	122
433	69	1	599	4		66
440	522	364	1033	334	760	1077
442	283	169	109	144	154	837
444	389	703	408	1033	594	829
445	454	596	379	959	141	776
448	376	31	1308	287	337	111
486	132	125	650	0	14	23
582	30	565	12	696	10	130
780	15	765		127	9	31
1215	185	315	480	1237	940	797
BA2			60		852	
CTL1	2206	106	246	175	199	1043
DV1	1191				833	43
HL1	43	48		814	25	21

SDG&E Response 33:-Continued

LV2	124	691	95	4		
MF1		642		48	680	688
MOR1	41	776	34	93	1	
MV1	465	644	7			
OK1	217	996	133	360	199	226
PE1	324	373	178	113	1105	205
QN1			856			
RA1		203	554		67	23
RD1			1067		155	
SE4		1000	509	399	126	199
SL1	199	1002	205	309	176	228

c. The term "worst performing circuits for SAIFI" will be interpreted using the methodology that was put in place for Performance Based Ratemaking. For the purposes of calculating Worst Circuit SAIDI and Worst Circuit SAIFI, the customers on each distribution circuit were considered as the customer pool in the calculations. This methodology is different than the normal calculation of SAIDI and SAIFI which uses the system customers to calculate those indices.

The circuits that had the highest Worst Circuit SAIFI for each of the years requested is shown below.

The request to identify circuits on an annual basis differs from the methodology that SDG&E uses to identify the circuits for the Worst Circuit SAIFI - which determines the circuits from the previous 5 years data. Consequently, not all circuits shown in this response are related to those in the Worst Circuit SAIFI list that SDG&E uses for PBR.

In the table below, the ten circuits with the worst Circuit SAIFI (on an annual basis) are shown. They are ranked by the Worst Circuit SAIFI value.

	2009	2010	2011	2012	2013	2014
1	353	445	230	445	444	SL1
2	350	SE4	440	444	170	MAN1
3	445	444	444	1215	440	OK1
4	908	221	79	440	RB1	BN1
5	440	212	217	79	172	221
6	221	792	486	OK1	1215	175
7	222	MV1	448	221	171	859

SDG&E Response 33:-Continued

8	448	SO1	170	442	RD2	BN2
9	442	1215	172	SL1	75	460
10	444	170	1215	792	222	440

d. As mentioned above in the response to 33c, SDG&E does not consider which circuits belong in the Worst Circuit SAIFI group on an annual basis. The table below shows the annual value for Worst Circuit SAIFI for all circuits that appear in the response to 33c, with their amount of Worst Circuit SAIFI for each year.

The grayed cells represent the ten Worst Circuits. If under a year column, the grayed cell represents that the circuits was among the top 10 Worst Circuits that year. When the grayed cell appears under the circuit list, it represents the 10 circuits that were identified in the 2015 PBR as the Worst Circuits – which is the average across 2009-2013. To be clear, only those circuits that are colored gray in the leftmost column are part of the PBR for Worst Circuit SAIFI.

Circuit	2009	2010	2011	2012	2013	2014
75	1.21	2.34	3.41	1.32	5.00	2.79
79	3.70	2.11	4.62	5.99	2.21	3.35
170	0.12	4.41	3.71	2.13	6.80	1.13
171	2.02	2.39	2.28	0.25	5.93	1.16
172	1.53	4.12	3.66	1.59	6.05	2.05
175	2.01	2.10	1.03	0.42	0.09	5.36
212	2.28	5.78	2.45	3.75	3.24	0.01
217	3.77	2.21	4.45	1.90	1.69	2.50
221	4.50	5.78	2.19	5.24	2.98	5.39
222	4.50	3.64	0.86	2.37	4.67	1.55
230	0.83	1.94	5.74	0.82	3.98	1.54
350	5.82	1.34	2.64	1.60	1.42	1.30
353	6.03	0.32	2.30	2.31	2.94	2.41
440	4.86	1.35	5.26	6.30	6.47	4.15
442	4.21	1.10	2.15	5.08	2.32	3.44
444	4.02	5.90	5.01	11.00	6.97	1.69
445	5.09	7.73	2.54	14.25	3.52	1.96
448	4.42	0.39	4.18	4.51	4.20	1.55
460	0.53	0.98	0.13	1.33	1.26	4.29
486	1.10	1.08	4.34	0.00	0.19	1.04
792	0.01	5.70	0.06	4.90	1.04	2.27

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859	0.36	0.51	0.53	1.57	0.96	4.95
908	4.95	1.17	0.32	0.80	0.70	0.16
1215	3.00	4.86	3.66	10.85	6.04	3.52
BN1	0.27		2.00	0.99	0.96	5.68
BN2		0.72		0.99	0.85	4.76
MAN1					2.94	7.99
MV1	1.81	5.17	0.08			
OK1	3.14	3.99	2.00	5.27	3.35	7.93
RB1	2.14	1.14	3.10	3.92	6.29	3.11
RD2	0.03			1.25	5.22	0.23
SE4		5.99	1.48	4.00	3.00	2.49
SL1	3.00	3.99	3.00	4.96	3.00	8.00
SO1		5.00	0.16		2.96	

e. The distribution circuits originating in Borrego are Circuits 170, 171, and 172. Each of these circuits has the capability to benefit from the Borrego Microgrid project. Due to the variety of weather conditions that Borrego experiences it is difficult to estimate with a large degree of certainty the types of improvements that the Microgrid project will bring. As the table in response to 33b indicates, annual SAIDI on circuit 170, for example, has ranged from 36 to 2,880 minutes. What can be said is that the Microgrid project has the ability to reduce the impact of some outages if they arise. This reduction of impact can take the form of reducing the number of customers experiencing an outage, as well as reducing the duration of the outage for those who experienced the outage.

f. All of the distribution circuits originating in Borrego appear on the Worst Circuit SAIDI list that is used for the 2015 PBR.

g. SDG&E has not determined an estimated SAIDI and SAIFI results for those years.

h. SDG&E does not agree that reliability performance has significantly worsened over the “last few years”. Below is a chart representing the last 20 years of data.

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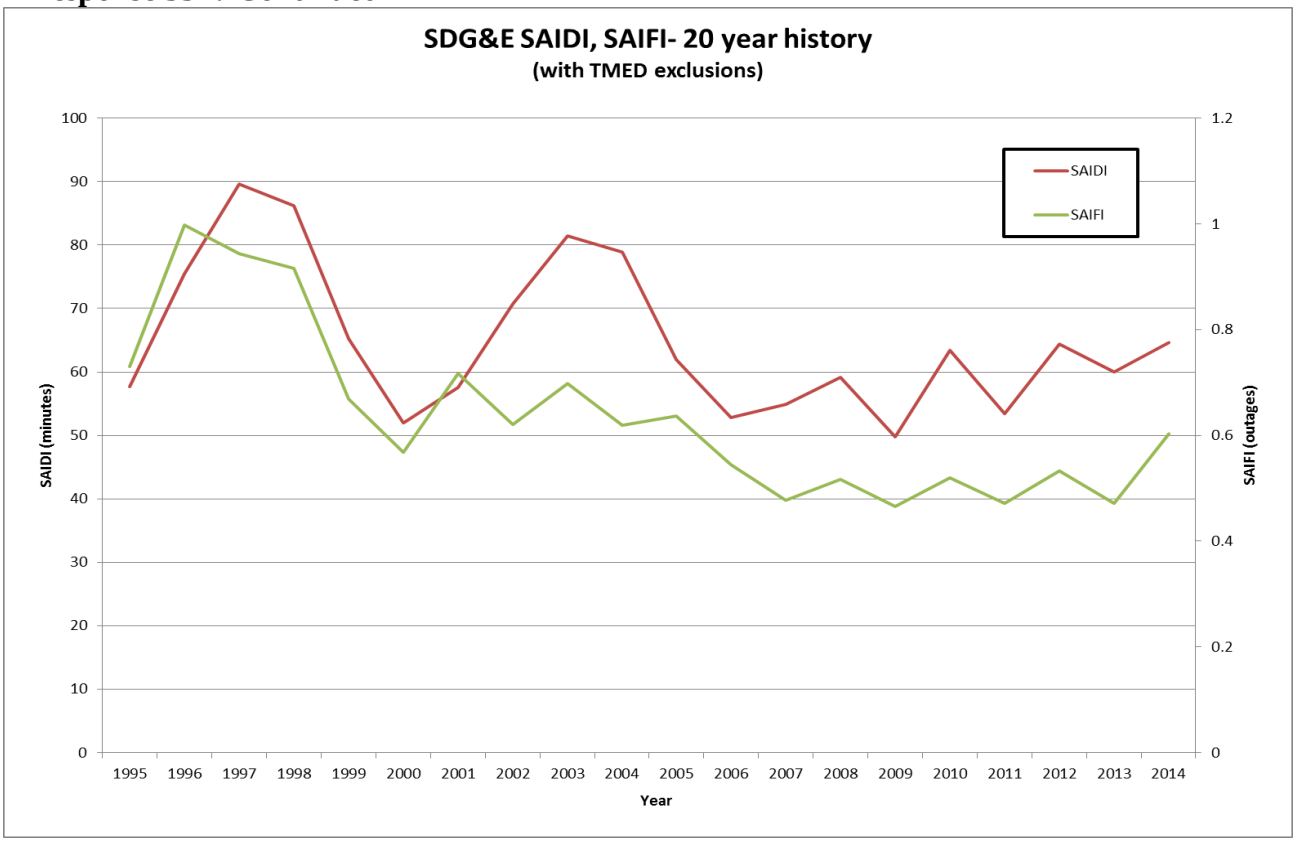

Although SDG&E believes that recent results are in the expected range of results, there have been upward pressures on reliability. The most significant pressure is from fire mitigation efforts which were enhanced in 2008; particularly the action of disabling reclosing during fire season. In 2014, due to the on-going drought, fire season was especially prolonged and it affected reliability more than most years. When reclosing is off, all outages become prolonged outages and may require line personnel to respond. When reclosing is on, many outages can be restored automatically and only cause momentary outages, which do not impact SAIDI or SAIFI. Momentary outages occur when an issue with the electrical system is temporary; for example, when a falling tree branch contacts electrical equipment then the branch falls to the ground. The reclosers will de-energize when the branch contacts electrical equipment, then an attempt is made to re-energize. If the branch no longer is contacting the equipment, the energy will flow normally. Having reclosers off affects both SAIDI and SAIFI.

SDG&E Response 33:-Continued

Additional upward pressure arises from aging infrastructure. As equipment ages, its failure rate will rise. This is especially true for the large amount of unjacketed cable that still exists in the system.

Another factor which appears like an upward pressure on the results is due to a change in reporting methodology in 2012. In conjuction with adopting IEEE standards, in 2012, SDG&E began to count customers in a more precise fashion. This change caused SAIDI to rise by over 5% and SAIFI to rise by over 6%. These changes do not impact actual reliability, but give the appearance of increases after 2012. For the purposes of generating targets for PBR, previous results were normalized.

In 2014, SDG&E was awarded the National Award for reliability by PA Consulting. This award was in addition to the Best in the Western Region reliability award that SDG&E has won for 9 consecutive years.

i. 2014 SAIDI including Major Events: 75.81 minutes
2014 SAIDI excluding Major Events: 64.60 minutes
2014 SAIFI including Major Events: 0.632 outages
2014 SAIFI excluding Major Events: 0.603 outages

j. PBR indices historically have been re-established at each GRC cycle under terms of the decision rendered in the relevant GRC. In meetings with CCUE in 2014 this topic was discussed. SDG&E expects the annual improvement factor to take effect in the second year of a PBR cycle, and continue until the end of that cycle.

k. SDG&E considers 2016 to be the first year of its PBR proposal. SDG&E considers the year 2015 to be the end of the current GRC/PBR cycle, as each GRC decision is applicable to the period specified in that decision, prior decisions having associated the GRC and PBR into coincident time frames. Therefore, the year 2016 will be the first year in the next cycle and the next PBR period.

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34. For each of the following categories of equipment, please identify (i) the average of the equipment of that type on the SDG&E system, (ii) the percentage of that equipment that was replaced in each of the years 2010-14, inclusive, (iii) the percentage of that equipment that SDG&E intends to replace in each of the years 2015 and 2016:

    a. Wood poles in FERC Account E364;
    b. Steel poles in FERC Account E364;
    c. Other poles (non-wood, non-steel) in FERC Account E364;
    d. Circuit breakers in FERC Account E365;
    e. Conductor in FERC Account E365;
    f. Underground conduit in FERC Account E366;
    g. Underground conductors and devices in FERC Account E367; and
    h. Capacitors in FERC Account E368.2.

SDG&E Response:

SDG&E's work history GIS data base captures the year that facilities were installed but does not distinguish between replacements and new installations. To determine how many facilities were replaced in years 2010 through 2014, reasonable assumptions were made. SDG&E has historically tracked the average age of poles and circuit breakers, and is able to calculate the average system age for those facility types. For the conductors and conduit, an average age could not be provided as many of the older data points were missing install dates. Please see the attached spreadsheet CCUE-SDG&E-DR-02_Supplemental Information tab "CCUE2 34".

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35. Please provide a copy of the 2016 depreciation studies cited in Ex. 28, pp. 36-45.

SDG&E Response:

Attached pdf files (2) are the specific Salvage Study and Mortality Study excerpts from work papers as cited in Ex. 28, pp. 36-45. These are included within the full work paper set "SDG&E-28-R-BWieczorek_Depreciation_CWP.pdf".

CUE 2 Q35 Salvage Study Ex.28 CWP 163-192.pdf
CUE 2 Q35 Mortality Study Ex.28 CWP 290-389.pdf

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36. With regards to SF6 switches:

a. SDG&E proposes to replace both SF6 switches and certain underground switches (Ex. 9, pp. 63-64). Please identify how many, if any, of each category of switch to be replaced are also in the other category.
b. SDG&E's SF6 testimony refers to replacing 900 switches over a 5-year period (Ex. 9 workpapers, p. 792) but also to replacing 200 switches per year (Ex. 9 workpapers, p. 796), which would be 1000 switches over 5 years. Please indicate:

i. How many SF6 switches does SDG&E have?
ii. How many does SDG&E plan to replace in each year from 2013-2018, inclusive?
iii. What number of switch replacements is 2016 is SDG&E seeking funding for?

SDG&E Response:

a)

SWITCH REPLACEMENTS BY BUDGET (CATEGORY)				
YEAR	289		14249	TOTAL
	Non-SF6	SF6	SF6	SF6
2015	40	20	0	20
2016	40	20	180	200
2017	40	20	180	200
2018	40	20	180	200
2019	40	20	180	200
2020	40	20	180	200
TOTALS	240	120	900	1020

b)

i. (Approximate, as of the end of 2014)

SF6 SWITCHES
1,017

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ii.

	BUDGET (CATEGORY)			
YEAR	289		14249	TOTAL
	Non-SF6	SF6	SF6	SF6
2013	19	13	0	13
2014	27	13	0	13
2015	40	20	0	20
2016	40	20	180	200
2017	40	20	180	200
2018	40	20	180	200
2019	40	20	180	200
2020	40	20	180	200

TOTAL	SF6
852	646

iii.

	BUDGET (CATEGORY)				
YEAR	289		14249	TOTAL	
	Non-SF6	SF6	SF6	SF6	TOTAL
2016	40	20	180	200	240

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37. With regard to underground (UG) switches:
SDG&E's testimony refers to a backlog of switches due for replacement (Ex. 9 workpapers, p. 286). Please indicate:

a. How does SDG&E identify underground switches that need to be replaced?
b. For each year from 2009-14, inclusive, how many underground switches were identified as needing to be replaced?
c. For each year from 2009-14, how many underground switches were replaced?
d. What is the expected lifetime of an underground switch?
e. What is the average age of the current (year-end 2014) population of underground switches?
f. How many underground switches were on the SDG&E system as of the end of each year from 2009-2014, inclusive?
g. How many switches were in the backlog (identified for replacement, but not yet replaced) as of the end of each of the years 2009-2014, inclusive?

SDG&E Response:

a) SDG&E schedules frequent inspections of all switches as part of the CMP program on a periodic basis. Depending on the type of switch being inspected, the inspector carries out the established guidelines set forth for properly determining the integrity of the switch being inspected. Examples include, but are not limited to, taking dielectric samples for laboratory assessment for oil switches and measuring the gas pressure of SF-6 insulated switches at the identified measurement points. Part of the inspection process also includes an assessment of any safety hazards that may be present from the switch in its existing condition. Each operation district follows up on those switches that have been deemed to require replacement out of physical, safety, or reliability concerns.

b) Switches identified as needing replacement are listed below by year, per CMP records:

YEAR	COUNT
2009	31
2010	61
2011	42
2012	44
2013	59
2014	54

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c) Switches identified as replaced under the 289 DOE (Do not Operate Energized) switch budget are listed below by year:

YEAR	COUNT
2009	36
2010	22
2011	37
2012	50
2013	32
2014	40

d) While conditions in SDG&E subsurface structures are not always the same, we estimate the life of an underground switch to be approximately 30 years for newer switches with recent technology features.

e) 14 years

f)

Year End	Total Underground Switches
2009	3,034
2010	3,135
2011	3,255
2012	3,388
2013	3,497
2014	3,651

g) Switch backlog counts at the **end** of each calendar year for the last 6 years are shown below:

YEAR	COUNT
2009	196
2010	206
2011	192
2012	156
2013	166
2014	175

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38. With regard to gas leak inspections and leak detection:

a. Please indicate if the $1.2 million per year expense for gas leak inspections (Ex. 4, p. 15:4 and pp. 17-18) represents SDG&E's total planned expenditures for gas leak detection? If not, please provide the planned expenditures for gas leak detection.
b. What are SDG&E's planned expenditures in each year of this GRC cycle for gas leak remediation?
c. Please describe the methodologies that SDG&E uses for gas leak detection, and the planned level of effort associated with each.
d. Please describe the status of implementation at SDG&E of any advanced gas leak detection methodologies such as the Picarro remote leak detection methodology currently being phased into service by PG&E.
e. Please provide any comparative data or studies in SDG&E's possession regarding leak detection rates **on the SDG&E system** for different leak detection methodologies.

SDG&E Response:

Note: That the total planned leak detection, inspection and remediation expenditures is the sum of Gas Distribution, Gas Transmission and Customer Service requests:

Gas Distribution and Customer Service:

a. The estimated forecast for gas distribution pipeline system leak detection that involves periodic leak survey work for Gas Distribution is $1,250,000 for the test year 2016. This is the figure shown in the direct testimony of Frank Ayala, Exhibit SDG&E-04, on page FBA-17. This is based on a selected forecast methodology of a five year average of this activity for the years 2009 through 2013. Included in this forecast are expenses for semiannual, one-year and five year interval leak surveys for below grade distribution pipelines including mains and customer service lines. Expenses are also included for monitoring above grade pipelines for atmospheric corrosion, pipelines in areas of unstable earth and pipelines crossing bridges and spans.

Other leak detection activities beyond the required Gas Distribution periodic leak surveys described above are:

- Leak detection activities performed by Customer Services Field (CSF) personnel responding to customer calls regarding reports of potential gas leaks.
- Leak Repair crews who are called out on a leak that has been detected in order to repair it. Their first activity is to detect the leak and pinpoint where it is for the crew to dig and repair.
- As a safety measure, leak detection equipment is used on a job site where new pipeline construction takes place to ensure that no gas is present during construction activities.

Response to Question 38a (Continued)

- Normal gas facility operation and maintenance activities, as a safety measure on below grade gas facilities, a gas leak detection device is used to check for the presence of natural gas before entering a vault where gas equipment is located.
- Periodic leak surveys for SDG&E's Gas Transmission pipelines. Expenses for these surveys are included in Other Services expense shown in the direct testimony of Frank Ayala, Exhibit SDG&E-04, on page FBA-16.

The other leak detection activities listed above however are a smaller part of each of the listed principal work activities. SDG&E has not forecast these other leak detection activities separately. These other detection expense forecasts cannot accurately be separated from the total expense forecasts for the principal activities for which they are associated.

For more details on Customer Services Field activities and forecast, please refer to the testimony of Witness Sara Franke (Ex. SDG&E-13).

b. Remediation of leaks found as a result of O&M leak detection activities for Gas Distribution for service and main pipelines are forecast within two groups outlined in the testimony of Frank Ayala Exhibit SDG&E-04. These and the amounts forecast are summarized in Table 1 below:

Table 1 - 2016 GRC SDG&E Gas Distribution Service and Main Maintenance O&M Expense

Item	Exhibit SDG&E-04-WP Workpaper Location	Title	2014	2015	2016	Comment:
			Amount in $(000) of $(2013):			
1	SDG&E-04-WP, Page 22-28	Main Maintenance	2,032	1,977	1,977	Investigate and repair leaks in gas mains; raise and lower mains for municipal utility conficts.
2	SDG&E-04-WP, Page 28-36	Service Maintenance	1,187	1,610	1,245	Investigate and repair leaks in gas services or service risers; raise and lower services and risers for municipal utility conficts or alterations in customer buildings.

As discussed in a. above, similarly, the remediation expenses are also included with other service and main forecast expenses such as raising and lowering the service or main or raising or relocating the service risers due to municipal utility conflicts or customer building construction. Consequently the specific leak remediation expenses have not been separately forecast, and cannot be accurately separated from the total forecast expense for all activities within the grouped expense.

c. There are basically three "methodologies" that SDG&E employs in leak detection:

1. Detecting leaks by an employee walking with a hand-held leak detection device monitoring for leaks directly above the target area with the device probe.

Response to Question 38c (Continued)

2. Detecting leaks using a mobile leak detection device mounted on the front of a service vehicle driving above or alongside of a gas main. If leaks are detected, the operator returns to the site and confirms the leak with a hand held device.

3. Detecting leaks by an employee using a hand held device at a remote location and "shooting" an infrared laser beam to detect the presence of natural gas remotely when the target area is hard to reach or not readily accessible.

   As described in the response to a. above, these methodologies are employed in all the gas activities for which leak detection is just one task and are included in forecasts for the principal activity involved. Therefore a forecast for just these specific leak detection methodologies used broadly throughout all the gas activities is not readily available.

Gas Transmission:

a.– c. For Gas Transmission at SDG&E, costs associated with the periodic leak surveys for transmission pipelines are performed by Gas Distribution. Expenses for these surveys are included in Other Services expense shown in the direct testimony of Frank Ayala, Exhibit SDG&E-04, on page FBA-16. Expenses for these surveys however are a smaller part of all the activity expenses in Other Services. SDG&E has not forecast these survey expenses separately. These survey expense forecasts cannot accurately be separated from the total expense forecasts for the Other Services workgroup and therefore are not readily available.
Other Transmission leakage detection/investigation activities such as leak detection associated with O&M and construction however are not an activity element that's budgeted or tracked separately from all other applicable Gas Transmission pipeline maintenance activities and expense.
Based on this, Gas Transmission is not able to provide historical, actual or forecasted cost for these specific activities.
Additionally, Gas Transmission testimony (Beth Musich, Exhibit SDG&E-05) is not seeking any incremental costing changes relative to this activity.

d. Picarro or other advanced gas leak detection technologies have not been implemented at SDG&E.

e. As stated in part (d) above, other advanced gas leak detection technologies have not been implemented at SDG&E thus no leak detection rates are available.

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SDG&E RESPONSE
DATE RECEIVED: MARCH 9, 2015
DATE RESPONDED: APRIL 1, 2015

39. With regard to OSHA recordable events (Ex. 2, p. 7:2; Ex. 3, p. 2:13):

    a. Please provide SDG&E's OSHA recordable rate for each of the years 2005-14, inclusive.

    b. What measures if any, is SDG&E proposing in this GRC to provide an incentive to continue reducing its OSHA recordable rate?

SDG&E Response:

This response provided by witness Sarah Edgar, exhibit SDG&E-24

a. OSHA Recordable Rates 2005-2014

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
5.63	4.92	4.47	4.11	3.20	3.07	2.25	2.26	2.31	2.20

b. Employee and public safety is a foundation of SDG&E's culture. Safety training, safety committees, as well as Behavioral Based Safety (BBS) and Grassroots Safety efforts will help continue to reduce OSHA rates in 2016 and beyond.

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40. With regard to the economic cost of outages, and the corresponding value of service (VOS):

a. Please provide SDG&E's most recent VOS study.
b. When evaluating the cost effectiveness of measures that will affect reliability, what values does SDG&E use for reductions to:

i. The frequency of outages.
ii. The duration of outages.

c. To the extent the answers to the previous question change from year to year (e.g., due to inflation), what values does SDG&E believe are most appropriate to use in evaluating capital additions made in 2016?

SDG&E Response 40:

a. There is no explicit VOS study. For the purposes of reliability work, SDG&E uses the structure and economic values from its most recent Reliability Performance Based Ratemaking (PBR) mechanisms as an indicator of VOS.

b. As stated above, values from PBR mechanisms are used:
   i. Currently, the PBR mechanism has a SAIFI index which indicates $375,000 per 0.01 SAIFI outages. Additionally, when circuits are being considered for reliability improvements and those circuits are in the Worst Circuit SAIFI list, an additional benefit is considered – namely, $125,000 per 0.10 Worst Circuit SAIFI outages.
   ii. Currently, the PBR mechanism has a SAIDI index which indicates $375,000 per 1 SAIDI minute. Additionally, when circuits are being considered for reliability improvements and those circuits are in the Worst Circuit SAIDI list, an additional benefit is considered – namely, $125,000 per 10 Worst Circuit SAIDI minutes.

c. For several years, prior to 2015 - including when the PBR mechanism was not active - SDG&E had used the most recent PBR mechanism values. Those values were $250,000 per SAIDI minute, and $250,000 per .01 SAIFI outage. The increase in 2015 to $375,000 respectively was negotiated, based upon considerations for inflation that occurred since the original values were set. For 2016, SDG&E believes that the current values – as stated in the response to 40b – will be appropriate.