BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Application of Southern California Edison Company (U338E) for Authority to Increase Its Authorized Revenues for Electric Service In 2021, among other things, and to Reflect That Increase in Rates.	Application 19-08-013 (filed August 30, 2019)

ERRATA

DIRECT TESTIMONY OF JOHN D. WILSON ON BEHALF OF SMALL BUSINESS UTILITY ADVOCATES

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SBUA
Small Business Utility Advocates

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I. Identification & Qualifications

Q: Mr. Wilson, please state your name, occupation, and business address.

A: I am John D. Wilson. I am the research director of Resource Insight, Inc., 5 Water St., Arlington, Massachusetts.

Q: Summarize your professional education and experience.

A: I received a BA degree from Rice University in 1990, with majors in physics and history, and an MPP degree from the Harvard Kennedy School of Government with an emphasis in energy and environmental policy, and economic and analytic methods.

I was deputy director of regulatory policy at the Southern Alliance for Clean Energy for more than twelve years, where I was the senior staff member responsible for SACE's utility regulatory research and advocacy, as well as energy resource analysis. I engaged with southeastern utilities through regulatory proceedings, formal workgroups, informal consultations, and research-driven advocacy.

My work has considered, among other things, the cost-effectiveness of prospective new electric generation plants and transmission lines, retrospective review of generation-planning decisions, conservation program design, ratemaking and cost recovery for utility efficiency programs, allocation of costs of service between rate classes and jurisdictions, design of retail rates, and performance-based ratemaking for electric utilities.

My professional qualifications are further summarized in Exhibit RII-1.

Q: Have you testified previously in utility proceedings?

A: Yes. I have testified more than a dozen times before utility regulators in the Southeast U.S. and Nova Scotia, filed joint testimony once with the CPUC, and appeared numerous additional times before various regulatory and legislative bodies.

II. Introduction

Q: On whose behalf are you testifying?

A: I am testifying on behalf of Small Business Utility Advocates. SBUA's mission is to represent the utility concerns of the small business community. Promoting an electricity rate structure that facilitates the success of small commercial customers with cost effective utilities supplying clean and renewable energy is central to this mission.[1]

There are approximately 3,941,201 small businesses in the state that comprise of 99.8% of all employer firms, provide 48.8% of private sector employment, account for over 280,000 net new jobs, and comprise approximately 43.2% of California's $152.1 billion in exports.[2] Small businesses are not only vital to California's economic health and welfare but also constitute an important class of ratepayers for utility companies.

Commercial ratepayers have historically consumed more than 28,000 gigawatt-hours of electricity annually, representing 34% of SCE's load and $4 billion in revenues.[3] The ratepayer interests of this class often diverge from residential ratepayers and larger commercial customers on a variety of utility matters. It is vital to small businesses that rate allocation and rate treatment are fair to all energy consumers.

Q: What is the scope of your testimony?

A: I reviewed the application of Southern California Edison (SCE) for Track 2 of its 2021-2023 General Revenue Case (GRC).

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[1] *See,* SBUA website at www.utilityadvocates.org.

[2] California Small Business Profile, U.S. Small Business Administration Office of Advocacy. *See* www.sba.gov/sites/default/files/advocacy/2018-Small-Business-Profiles-CA.pdf.

[3] Based on SCE's 2018 GRC Phase II workpapers.

Q: What issues do you address?

A: SCE introduced a new electronic vegetation management system (Clearion VMS) in 2018, which failed immediately upon deployment. After a period of reverting to a paper and spreadsheet management system and two attempts to re-launch the Clearion VMS software, SCE identified an architecture flaw and decided to procure a remedial software solution rather than re-engineer the original software. SCE now intends to acquire a new VMS software platform. I have examined whether it is reasonable for the costs associated with this remedial software to be included in SCE's authorized revenue requirement.

Q: What are your conclusions regarding the SCE application?

A: SCE's expenditures to replace its vegetation management system (VMS) software should be deemed to result from imprudent procurement of the Clearion VMS.

Although SCE declined to document its process for procuring the Clearion VMS software, it appears that the problems originated with a flawed software procurement and implementation process. SCE blames work management challenges that drove up costs for line clearances on the rapid ramp-up and increased work scope, but SCE should have known that a higher level of line clearing would be required from time to time (e.g., during droughts and insect infestations), and procured software that could accommodate SCE's requirements in a busy year. The procurement process for the Clearion VMS software did not appear to have considered the fact that line clearing crews would often operate in remote areas without the ability to synchronize their database for weeks at a time. It is not clear whether SCE included pilot testing to verify the functionality of the Clearion VMS software for its requirements. SCE has not demonstrated that it used a competitive (rather than sole-source) procurement or that it consulted other California utilities that had been using VMS software for a decade or more.

Decommissioning the Clearion VMS software and reverting to a paper and spreadsheet-based system caused SCE's line clearing crew productivity to plummet by 20 to 50 percent, resulted in sub-optimal coordination across SCE's five vegetation management programs, inefficient crew scheduling, and increased travel time between tree trimming assignments. The two re-introductions of the Clearion VMS software required additional training of staff, as well as increased expenses for data analysts to resolve data conflicts. Much of the inefficiency in 2018 and 2019 could have been avoided if SCE had conducted a root-cause analysis of the failure and re-evaluated the suitability of the Clearion VMS software immediately after it failed.

SCE's remedial software solution, Survey123, is not a permanent capital purchase. SCE plans to replace it in 2020 with yet another software system. At least some of the limitations of Survey123 were known to SCE when it decided to procure this software in 2019. The choice of the Clearion VMS imposed the labor and productivity costs of the manual system, the re-introductions, the conversion to Survey123, and the need to procure a future system.

Q: What do you recommend?

A: The Commission should disallow ~~$80.7~~ 79.3 million in vegetation management system costs for 2018–2019. The costs of the Clearion VMS were already recovered from ratepayers through rates in the 2015 and 2018 GRCs.

First, the Commission should disallow the costs related to the remedial purchase of the Survey123 software for vegetation management and remedial training activities, because those costs stem from SCE's previous failure to prudently procure and implement VMS software. Furthermore, since the Survey123 software will soon be replaced, it will be neither used nor useful, and it is not reasonable to authorize cost recovery as a capital expense. I recommend that the Commission

disallow $4.2 million in 2019 capital expenditures on Survey123 ~~and $1.4 million in training costs as imprudent.~~[4]

Second, I recommend that the Commission determine that the 2020 capital expenditures of $2.9 million on Survey123 (and any further such expenditures) are also deemed imprudent, and take appropriate action to exclude those costs from future cost recovery. This amount is not included in the $~~80.7~~ 79.3 million total since it is outside the scope of the Track 2 revenue request.

Third, I recommend that the Commission disallow the excessive line clearing costs resulting from the failure of the Clearion VMS software because SCE should have had an efficient VMS software tool in place in 2018. The resulting inefficiency is a partial reason that SCE had to contract for additional clearing crews at higher contract rates. Due to the incomplete record of performance and the impossibility of linking the software failure to the underutilization of specific crews, I have made a reasonable estimate that 20% of line clearing costs should be deemed imprudent, which is a total of $75.1 million.

III. Background of the vegetation management system software.

Q: What is the vegetation management system software?

A: SCE explains the VMS software as follows:

> Prior to 2018, SCE did not have work management software for its routine vegetation work, relying instead on a paper-intensive system coupled with data collection software. In mid-2018 … SCE transitioned to an electronic vegetation management system (VMS).[5]

[4] ~~As discussed below, SCE has indicated that it intends to file errata removing these training costs from the incremental revenue requirement on September 4, 2020~~.

[5] SCE Testimony, p. 35, lines 8-11.

> At the highest level, the VMS system was composed of three parts. 1) Software with a local database on an end-user's (field personnel and planners/schedulers) computing device, 2) back office services and a 3) database(s) that runs in SCE's data centers. The VMS running on the end-user device synchronizes with the SCE back-end via cellular communications.
>
> The initial project scope and design in 2016 considered several hundred end-users with a sophisticated user interface screens for planners and schedulers and simpler field personnel user interface screens for inspection, trimming and quality assurance.[6]

The VMS software was procured from Clearion Software LLC, which further describes the software as "a series of modules that is built to work with the ESRI ArcGIS platform."[7]

Q: Why did SCE switch from a paper-based system to VMS software?

A: SCE explains as follows:

> The main challenge of the paper-based system … was the inability to see assigned work on a map. The work points were exported into a spreadsheet format, which was not listed in the optimal order to be completed for tree trimming crew planning and work completion efficiency.
>
> … As a result, tree trimming crews spent more time each day locating trees that required work, and less time actually trimming the trees.[8]

Q: Please describe the procurement of the Clearion VMS software.

A: SCE declined to provide documentation of its procurement process for the Clearion VMS software,[9] so I do not know whether this was a sole-source procurement, what were used, etc.
criteria^. SCE did provide the following explanation:

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[6] Attachment RII-2, p. 1.

[7] See, http://clearion.com/solutions/vegetation-management/. Accessed August 28, 2020.

[8] Attachment RII-3.

[9] Attachment RII-21.

> [SCE] procured the VMS in October of 2016 … The VMS was a Commercial Off The Shelf (COTS) package … SCE preferred to utilize a COTS solution at the time the decision was made in 2016, rather than developing from scratch, because it was aligned with SCE's strategy to reduce the creation of new custom-developed software solutions.[10]

In addition to obtaining a list of 41 utilities that had previously implemented the VMS software,[11] SCE obtained references from five utilities.[12] Of those five utilities, SCE was able to provide the number of crew and data users for three:

- DTE – 350 crews, 120 data users
- Southern Company – 400 crews, 60 data users
- Florida Power and Light (transmission) – 100 crews, 30 data users

SCE did not have any information in its possession regarding the number of miles of line or other factors related to the scale of vegetation management work.[13] While public data are available regarding the miles of transmission and distribution lines on these systems, I do not know if the utilities use the Clearion VMS to manage crews across all or just a portion of their transmission and distribution systems.

Q: What was the intended use of the VMS software?

A: SCE's 2016 "initial project scope and design" included three elements:

1. Several hundred end-users using either:
   - Sophisticated user interface screens (planners/schedulers), or
   - Simplified interface screens (field personnel).
2. Back office services.
3. A database running in SCE's data centers.[14]

[10] Attachment RII-4.

[11] Attachment RII-5.

[12] Attachment RII-6.

[13] Attachment RII-7.

[14] Attachment RII-2.

Q: What was the cost of the VMS software?

A: SCE's costs included capital costs of $5.75 million and O&M costs of $0.34 million.[15] The majority of the capital costs were $2.0 million paid to Clearion Software LLC and $1.7 million paid to Environmental Systems Research Institute (ESRI). ESRI also received most of the O&M costs. According to SCE, these costs were "part of base IT capital within the 2015 GRC and 2018 GRC filing scope."[16]

Q: Did the VMS software vendor provide any performance guarantee or warranty?

A: SCE states that there were warranty provisions in the sales agreement between SCE and Clearion, but:

> The limitations of liability provisions in the sales agreement between SCE and VMS were developed as part of a broader negotiation that included many terms, including scope and price. It is common for contracts of this nature to have limitation of liability provisions, including mutual waivers of consequential damages and monetary caps, subject to certain exceptions.[17]

Q: Was SCE reimbursed for any financial costs by the VMS software vendor?

A: No.[18]

[15] Attachment RII-8.

[16] Attachment RII-9.

[17] Attachment RII-10.

[18] Attachment RII-10.

IV. Failure of the Clearion VMS software.

Q: Please describe the failure of the Clearion VMS software.

A: SCE states "performance issues manifested themselves quickly" after the Clearion VMS software was deployed during Q2 or August of 2018.[19] SCE found that the "scale of vegetation management work in SCE's territory, along with the number of crews (users), exceeded the software's scalability limits and severely impacted broad deployment of the VMS."[20]

SCE did not provide information regarding the number of crews or users that were using the system in August 2018. Also, as I will discuss later in my testimony, SCE also provided evidence that indicates that a critical factor was the impossibility of keeping Clearion VMS users' databases synchronized.

Q: What were the productivity impacts of the Clearion VMS software failure?

A: SCE states that the problems had a "considerable impact on productivity."[21] Due to the problems with the Clearion VMS software, SCE transitioned back to a paper-based system.

The problems with the Clearion VMS software led to "decreased utilization of crews."[22] SCE acknowledges that field personnel used "productive 'work time' waiting for technical support" of the VMS software, including "system updates, device repairs, and general user issues."[23]

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[19] SCE states that deployment occurred in the second quarter of 2018. (Attachment RII-2) However, elsewhere SCE states that it transitioned to the VMS software in August 2018. (Attachment RII-11) These statements may be consistent, depending on the exact meeting of "deployment" and "transitioned."

[20] SCE Testimony, p. 35, lines 12 - 14.

[21] SCE Testimony, p. 35, line 16.

[22] SCE Testimony, p. 35, line 17.

[23] Attachment RII-12.

After SCE decommissioned the VMS software and reverted to the paper-based system, productivity and efficiency suffered at every step in the process.

At the highest level, although not acknowledged by SCE, the failure of the Clearion VMS software likely resulted in sub-optimal coordination across the vegetation management programs (DRI, HTMP, Pole Clearing, Routine, and Non-Routine).[24] Prioritizing and assigning crews individually by program would result in less efficient crew schedules than a unified assignment system. Furthermore, a paper-based system would either have required extra back-office processing to create and communicate geographically-optimized assignments or have resulted in inefficient use of crews due to suboptimal assignments. Without software-based work planning,[25] neither annual scheduling and crew allocation nor the scheduling of crews across all vegetation management programs appears to have been handed efficiently.

Once crews received their assignments on paper, the productivity problems worsened. SCE states that "main challenge of the paper-based system … was the inability to see assigned work on a map. The work points were exported into a spreadsheet format …" After completing work at one site, the crew would need to "look through the entire spreadsheet (sometimes 10 or more pages long) for work in close proximity." Due to the increase in travel time, crews spent "less time actually trimming the trees."[26]

Then, even when they were at an assigned field location, data quality issues could not be easily resolved.[27] Crews needed to manually transmit updated information to back-office personnel, rather than entering the information directly

[24] Attachment RII-13, p. 1.

[25] Attachment RII-13, p. 1.

[26] Attachment RII-3.

[27] Attachment RII-13, p. 1.

into the system. Resolving a data quality issue would require a phone call, email or text to a person in the back office rather than simply accessing a database to correct the problem. Presumably, if no cellular signal was available, the crew would have to travel to a location with service.

While SCE was unable to provide data quantifying the impact of these problems on crew utilization, it appears very serious. SCE explained that it "could not release these crews based on the extremely scare resource availability of qualified tree trimmers in California at that time. … SCE could not risk losing the crews to other utilities and not being able to hire them back promptly later."[28] When the alternative to crew productivity problems is releasing the crew, the problem is probably not a loss of 10 or 20 percent, but likely more on the order of 50 percent.

It is also reasonable to estimate that crew productivity was reduced by something on the order of 50 percent during much of the year is the sheer number of reasons that crews were inefficiently deployed. Travel times were longer not just because they lacked an easy way to map all the work locations, but also because crews may have been overlapping their work areas due to uncoordinated work in the back office. Delays in resolving problems on site were exacerbated by the lack of a mobile database platform. Additional training due to the multiple transitions between different vegetation management systems also reduced crew productivity.

Q: Did SCE and Clearion LLC attempt to fix the VMS software?

A: Yes, SCE states that in October 2018, SCE and Clearion LLC attempted a "re-architecting [of] the back office database," but this effort failed. In March 2019, SCE again attempted to re-introduce the Clearion VMS software with training on new

[28] SCE Testimony, p. 35, line 17 through p. 36, line 4.

work practices and a "dedicated team of data analysts to resolve data conflicts on an on-going basis."[29]

Even though the Clearion VMS system performed acceptably during a pilot test[30] and several weeks of full operation in March 2019, problems quickly resurfaced. At this point, SCE or Clearion LLC identified "a potential architecture flaw that created data degradation and performance issues each time a user would synchronize a database that was not up to date." These problems could be triggered by a user working in a remote area for a few weeks or even going on vacation for a few weeks.[31]

Q: Why didn't SCE or Clearion LLC identify the VMS software's architectural flaw during procurement?

A: Since SCE declined to provide procurement documentation, I do not know what testing SCE utilized or potential problems it investigated. However, one concern is that SCE may have relied too heavily on references from other utilities.

As discussed above, SCE obtained references from five utilities.

- Southern Company is potentially the most comparable utility in terms of size and expansiveness of its transmission and distribution systems. However, the information provided by SCE does not make it clear whether the Clearion VMS software is used for all of Southern Company's operations, or only a part of them. It is possible that Southern Company and

[29] Attachment RII-2, p. 2-3.

[30] SCE's Testimony (p. 35, line 12) implies that the pilot testing occurred prior to implementing the Clearion VMS software in the initial instance. However, SCE's response to our data request appears to clarify that this pilot testing occurred in March 2019. If my interpretation is correct, then SCE did not pilot test the Clearion VMS software prior to initially implementing it in August 2018.

[31] Attachment RII-2, p. 3.

(then four) operating companies have separate management systems for line clearing and other field operations. Also, even though Southern Company's system passes through rural areas, some with small mountains, crews would have been able to synchronize databases on a daily basis.

- Florida Power & Light is also comparable to SCE's size, but has only a small portion of its system in remote, rural areas.
- DTE and IPL are fairly compact, primarily distribution-based utilities.
- Public Service of New Mexico also has relatively few miles of non-urban transmission, with much of its non-urban system being located in desert regions with little need for line clearing activities.

If SCE relied primarily on these references to determine that the Clearion VMS would perform well on its system, then it did not obtain information relevant to the need to maintain data synchronization in regions with heavily forested, challenging terrain.

Without access to any documentation regarding the procurement of the VMS software, I can only rely on what was (and was not) discussed in the information provided by SCE, from which it appears that the procurement process relied heavily on the vendor's representations and information obtained from the five users. For example, SCE does not discuss any pre-purchase testing or definition of usage requirements. It appears possible that neither SCE nor the software vendor considered it important that SCE's line clearing crews would operate in areas where they might not access the main database for "a few weeks."

Although SCE attributed its work management problems to the "scale of vegetation management work in SCE's territory, along with the number of crews (users),"[32] this diagnosis is not supported by SCE's more detailed evidence. The software architecture flaw relates to users synchronizing databases that were not up

[32] SCE Testimony, p. 35, lines 12-14.

to date. SCE staff were well aware of the need for its trimming crews to operate in remote areas, as demonstrated by SCE's budget policy regarding the necessary lodging.[33]

Q: What were the consequences of the failure to identify the Clearion VMS software's architectural flaw during the procurement process?

A: SCE acknowledges that work management challenges, particularly relating to the failure of the Clearion VMS software and hence to the flawed software procurement and implementation processes, contributed to the incremental costs for line clearances in 2018 and 2019. These extra costs compounded the challenges of the increased workload in response to the wildfire threat.

Q: What other impacts of the decreased utilization of crews should concern the Commission?

A: As discussed above, it appears that SCE had a substantial number of tree trimming crews sitting idle (or severely underutilized) for substantial periods of time. However, SCE's testimony indicates that utilities across California were engaged in a fierce competition for scarce resources. Tree trimming contractors were being hired from out of state and there were simply not enough to go around.

While SCE paid its contractors for underutilized crews, other utilities could likely have utilized those crews. SCE's VMS software failure had the indirect effect of driving up costs for other utilities since overall resources were being underutilized.

As an analogy, when SCE is experiencing local resource adequacy issues, but can't deploy its available generation resources due to transmission constraints, SCE should not idle those units. SCE should make those generation resources available to other utilities. Incomplete utilization of committed resources would result in higher

[33] Attachment RII-14.

market prices and hence total costs. Similarly, SCE's failure to lend or subcontract its contracted crews to other California utilities increased costs statewide.

V. Implementation of the replacement Survey123 software.

Q: What is the Survey123 software?

A: The Survey123 software is a premium add-on to the ESRI ArcGIS Online (AGOL) software. According to ESRI's website:

> ArcGIS Survey123 is a simple and intuitive form-centric solution for creating, sharing, and analyzing surveys in three easy steps. Create smart forms with skip logic, defaults, support for multiple languages, and much more. Collect data easily via the web or mobile devices in any environment and with minimal training. Analyze results quickly to make actionable decisions. Fully integrated with the ArcGIS platform, you can gather data using your computer or any mobile device in the field, even when offline, and then securely upload it to ArcGIS for further analysis.[34]

SCE further describes the Survey123 software as a "low-code cloud platform" "that uses modern mobile device synchronization designs." SCE developed forms and database structure using in-house resources.[35]

Each Survey123 form has a separate database; forms with different data structures cannot be integrated. Furthermore, the capabilities of Survey123 are limited by ArcGIS online. For example, large video files cannot be captured and referenced in Survey123 because this is not supported in ArcGIS.[36]

Q: Why did SCE decide to utilize the Survey123 software?

A: When SCE became aware of the serious architecture flaw in the Clearion VMS software, SCE decided that some other solution would be more "prudent" than "re-

[34] See: https://www.esri.com/en-us/arcgis/products/arcgis-survey123/buy. Accessed August 28, 2020.

[35] Attachments RII-2 and RII-4.

[36] Attachment RII-15.

engineering the software product to make it robust enough."[37] SCE does not provide a specific reason for not continuing to use the paper-based management process, but it seems reasonable to assume that SCE was seeking additional productivity enhancements to address the shortcomings of the paper-based system. As discussed below, SCE does report that the number of trims per crew per day increased once the Survey123 software was implemented.

SCE was using Survey123 for electrical inspections in 2019,[38] and may have selected Survey123 based on familiarity and confidence that Survey123 would address some critical functions.

Q: Could SCE have selected Survey123 instead of the Clearion VMS software in its original procurement?

A: Yes. SCE states that it "procured the VMS in October of 2016 and the capabilities required to develop and implement a comparable solution with Survey123/AGOL were not available at the time."[39] However, Survey123 was available in June 2016.[40] Both the Clearion VMS software and Survey123 are commercial off-the-shelf solutions integrated with ArcGIS, although SCE needed to develop the forms and supporting database for Survey123 in-house. As noted earlier in my testimony, SCE refused to provide procurement documentation related to the Clearion VMS software, so I was unable to verify the scope of their product evaluation. It seems likely that SCE simply overlooked Survey123 and other similar "low-code" software alternatives in its procurement process.

[37] Attachment RII-6, p. 3.

[38] SCE Testimony, p. 36, line 6.

[39] Attachment RII-4.

[40] Attachment RII-16.

Q: When did SCE implement the Survey123 software?

A: SCE implemented the Survey123 software in either August or September 2019.[41]

Q: What costs is SCE seeking to recover for the Survey123 software?

A: SCE is requesting cost recovery of $4,218,480 for 2019 expenditures. SCE has also spent an additional $2,858,650 on Survey123 costs for vegetation management in 2020.[42] The largest expenses in 2019 were $1.6 million for Zones, Inc. (a software company) and $1.2 million for in-house labor. It is unclear what specific work Zones, Inc. did for this project. In 2020, the largest expenditure was $1.7 million to ESRI.

Q: What were the training costs associated with the Clearion VMS and Survey123 software?

A: SCE did not provide a full accounting of the costs related to training contractors on the software in response to a data request. SCE stated,

> Although SCE originally requested $1.4 million in incremental Training and Development costs, SCE made an incorrect escalation calculation that, when corrected, results in no incremental expenditures for this activity. SCE will correct this error in an errata filing.[43]

~~I am advised by counsel that SCE will file this errata on September 4, 2020 so I am unable to review this material and better understand the nature of the training costs.~~

SCE filed an errata on September 4, 2020. The errata suggests that the incremental Training and Development costs are not, in fact, related to vegetation management.

[41] Attachments RII-18 and RII-20.

[42] Attachment RII-18.

[43] Attachment RII-19.

VI. Overall productivity impacts of the vegetation management system work assignment methods.

Q: How did the different methods of assigning and managing the vegetation management workload compare?

A: SCE provided very limited productivity metrics in this area. The most relevant metric is SCE's reported trims per crew per day, as provided in Table 1. Unfortunately, these data are unavailable for August 2018–April 2019 when the Clearion VMS software was in use.

Table 1: Vegetation Management Productivity

Management System	*Timeframe*	*Trims per Crew-Day (approximate)*
Historic (paper-based)	Pre-August 2018	10 – 12
Clearion VMS software / Paper-based	August 2018 – April 2019	No data
Paper-based	May and June 2019	8
Paper-based w/enhanced management	July and August 2019	10
Survey123	September 2019 onward	12

Source: Attachment RII-22. Note that during the October 2018 to March 2019 time period, SCE switched back to the paper-based management system, but it did not provide data specific to this time period.

SCE considered the paper-based system to be a substantial improvement over the Clearion VMS software, so productivity when the Clearion VMS software was causing problems must have been even lower than the 8 trims/crew-day with the paper-based system in May and June 2019. Thus, the VMS software led to approximately 13 months of degraded productivity, compared to performance with the Survey123 software.

I also assume that the number of crews in the field varied from 6 trims/crew-day to 10 trims/crew-day during the 13 months of degraded productivity. Since SCE did not provide exact dates at which it transitioned between vegetation management systems, I am unable to perform a granular calculation. Relative to the productivity

achieved with Survey123, a reasonable estimate is that crews were utilized at about two-thirds.

Another factor that needs to be considered in assessing productivity is the number of crews in the field by month. SCE did not provide these data in response to a request for "any productivity metrics."[44] A reasonable estimate based on SCE's testimony is that the number of crews in the field was on the order of 50% higher beginning in August 2018.

Considering ~~both~~ all three of these factors, I estimate that SCE's line clearing productivity was reduced by 20% over the 2018 – 2019 time period.

During 2018 and 2019, total line clearance expenses were $375.5 million.[45] If 20% of these expenses were due to SCE's imprudence, the excess costs would be $75.1 million.

VII. Usefulness of the Survey123 software.

Q: Does SCE plan to maintain the Survey123 software in service?

A: No. SCE states that the Survey123 software cannot "provide the capabilities needed to optimally support its vegetation management activities." SCE indicates that it requires a "single platform-based solution" and that the need for an Integrated Vegetation Management platform is described in its 2020 Wildfire Mitigation Plan filing.[46] SCE plans to implement such a replacement system in late 2020.[47]

[44] Attachment RII-22.

[45] SCE Testimony, Table II-7, p. 31.

[46] Attachment RII-13.

[47] Attachment RII-11.

SCE provides several reasons that the Survey123 software cannot be "an optimal tool" and causes inefficient or suboptimal work.[48] Among the reasons cited by SCE, Survey123 cannot prioritize vegetation management work across all programs (e.g., routine and non-routine), resulting in increased manual processes in the back-office and inefficient work assignments for crews. Survey123 also has reliability issues resulting from a "lack of customer role mapping [which] requires the use of contractor specific content."

Q: Was SCE aware of these limitations when it decided to utilize Survey123 software to replace the VMS software?

A: Yes, it appears so. As discussed above, SCE was using Survey123 software for managing electrical inspections when it decided to use it for vegetation management. Since one of the important limitations of Survey123 is its inability to integrate forms with different data structures, SCE would have known of this limitation when the procurement decision was made. The choice of Survey123 was driven by the need for some short-term improvement in a system that failed due to the inappropriate choice of Clearion.

VIII. Reasonableness and prudence of costs related to the consequences of the VMS software failure.

Q: Did SCE prudently perform its duties in the procurement of the Clearion VMS software?

A: No. SCE failed to prudently perform its procurement duties in three ways.

First, SCE failed to prudently establish the proper process for evaluating potential VMS software. SCE has not shown that the procurement of the Clearion

[48] Attachment RII-13.

VMS software adequately considered the distinct circumstances in which line clearing crews operate in California. Nor did SCE demonstrate prudent management as it failed to demonstrate that it engaged in adequate testing or piloting prior to accepting the software and fully transitioning to its use. SCE appears to have relied on nothing more than the untested assertions of Clearion LLC and five of its clients, whose experience with the software was apparently of limited relevance.

Second, SCE knew or should have known that the Survey123 software and potentially other alternatives were available at the time SCE implemented the VMS software. SDG&E has used VMS software since at least 2007.[49] It is not clear whether SCE consulted with SDG&E or PG&E regarding their VMS software and any lessons learned from those consultations. If SCE had followed practices consistent with the needs of its utility system, SCE would have procured an alternative to the Clearion VMS software or would have remained with the paper-based system until suitable software was available.

Third, while the circumstances under which the Clearion VMS software was deployed were unexpected, the volume of tree trimming and removals was not so extreme and unprecedented that it represents a fundamental change in what level of performance was needed from the VMS software. For example, SCE's tree removals are usually less than 10,000 per year, but in 2017 SCE removed over 30,000 trees.[50] Tree removals fell over 80% in 2018, and while they rebounded in 2019, the level of effort remained about 13% less than 2017 . As it purchased the Clearion VMS software in 2018, SCE knew that its line clearing activity might need to meet or exceed the 2017 level, and that its VMS software would need to accommodate that

[49] SDG&E's use of a computerized Vegetation Management System in July 2007 is documented in D.18-07-025 (pp. 17-18).

[50] SCE Testimony, Table II-10, p. 35.

activity. Thus, in its procurement process, SCE failed to prudently give due consideration to the capability of the VMS software to support foreseeable trimming levels.

Furthermore, to the extent that SCE's needs were unprecedented, it is not appropriate to excuse these three failures on the basis that new conditions occurred. To do so would be to excuse any failure of management to anticipate an unprecedented outcome. Electric utilities routinely engage in risk management activities that are concerned with unlikely conditions.

Q: Did SCE prudently respond to the failure of the Clearion VMS software?

A: No. Once the Clearion VMS software failed in August 2018, a prudent manager would have directed a root cause analysis of the failure and re-evaluated the suitability of the software for SCE's current needs. Instead, SCE and the vendor quickly implemented a partial fix that was later demonstrated to be inadequate.

As demonstrated by the limited productivity metrics provided by SCE, the paper-based system had provided SCE with a reasonable (albeit likely poor) level of efficiency in the past. Instead of reverting to the paper-based system until the root cause analysis and software re-evaluation process were complete, SCE and its vendor tried a quick fix and then a re-training strategy. This suggests that SCE did not have any contingency plan for the failure of the Clearion VMS software when it was implemented. Instead, SCE doubled-down, twice, resulting in updated software and procedures that were ultimately neither used nor useful, requiring multiple rounds of back office and crew trainings on software and procedures that were quickly abandoned, thus further exacerbating the inefficiency by which line clearing crews were managed.

Q: Should the Commission authorize recovery of costs related to implementation of the Survey123 software?

A: No. SCE is seeking cost recovery for remedial software purchase and development costs that stem from its previous failure to prudently procure and implement VMS software. The costs related to the Survey123 software are unreasonable because SCE should not have had to incur them, and should be excluded from its authorized revenue requirement to be recovered from ratepayers.

Furthermore, the costs related to the Survey123 software do not represent a useful investment. According to SCE's discovery response, vegetation management technology solutions expenses are being requested as a capital expenditure.[51] Since the Survey123 software will soon be neither used nor useful, it is not reasonable to allow recovery of its cost.

Thus, I recommend that the Commission find that the $4.2 million in 2019 expenditures on Survey123 be deemed to result from SCE's imprudence. I also recommend that the Commission determine that the 2020 expenditures of $2.9 million on Survey123 are also deemed imprudent. Because the 2020 expenditures are not included in this Application, the Commission should determine an appropriate means of ensuring that those costs, and any further such expenditures, are not recovered from ratepayers.

~~I also recommend that the Commission should deem the $1.4 million in training costs be deemed to result from SCE's imprudence.[52] The trainings on software and practices that were quickly abandoned are neither used nor useful at this time and should not be recovered in rates as a capital expense.~~

[51] The costs shown in Attachment RII-17 (or 11) match those in data response

[52] ~~As discussed above, SCE has indicated that it intends to file errata removing these training costs from the incremental revenue requirement on September 4, 2020~~

Q: Should the Commission partially disallow costs for line clearance due to the inefficiency that resulted from the failure of the Clearion VMS software?

A: Yes. SCE failed to prudently manage its VMS activities by failing to have VMS software in place to handle the unexpected surge in line clearance work in 2018. In contrast, SDG&E has been using VMS software since at least 2007. This delay in implementing needed management systems directly resulted in an increase in line-clearing costs. SCE should have implemented an efficient (or at least functional) VMS software tool in place in 2018, and the costs that resulted from this failure should be excluded from its authorized revenue requirement to be recovered from ratepayers.

Instead, in order to complete necessary line clearing work, SCE faced the necessity of contract for additional out of town line-clearing crews at "increased contractual costs from rate changes and a tightened labor market for qualified tree trimmers across California."[53] While the increased volume of work alone would have driven an increase in SCE's costs for line clearances, the work management challenges stemming from the failure of the VMS software system also drove up costs.

Thus, I recommend that the Commission find that a portion of the incremental line clearing costs were incurred imprudently. Due to the incomplete record of performance and impossibility of linking the software failure to the underutilization of specific crews, the portion that should be deemed imprudent can only be a reasonable estimate.

As discussed earlier in my testimony, a reasonable estimate is that for the 13 months between the time that the Clearion VMS software was initially deployed to the time when the Survey123 software was deployed, crew productivity averaged

[53] SCE Testimony, p. 32 lines 24-25.

two-thirds the level achieved after the Survey123 software was deployed. It is also a reasonable estimate that the number of crews in the field was on the order of 50% higher beginning in August 2018. Based on these two estimates, I recommend a 20% disallowance of line clearing costs over the full 2018 – 2019 time period.

Q: Did the PricewaterhouseCoopers audit establish the reasonableness or prudence of SCE's expenditures with respect to the VMS software or the Survey123 implementation by SCE?

A: No, the VMS software was out of scope for the PricewaterhouseCoopers audit and SCE states that PwC did not create any workpapers specific to Survey123.[54]

Q: Please summarize the disallowance do you recommend to the Commission?

A: I recommend disallowance of the Survey123 software costs, ~~related training costs~~, and 20% of the line clearance costs. As shown in Table 2, the total recommended disallowance is $~~80.7~~ 79.3 million.

Table 2: Recommended Disallowances of Software and Line Clearing Costs

Costs	*Amount*
2019 Survey123 Costs	4.2 million
~~Training Costs~~	~~1.4 million~~
20% of Line Clearance Costs	75.1 million
Total	**$ ~~80.7~~ 79.3 million**

In addition, I recommend the Commission take appropriate action to ensure that SCE does not recover the $2.9 million of Survey123 costs associated with vegetation management for 2020 or any further such costs.

Q: Does this conclude your testimony?

A: Yes.

[54] Attachment RII-9 and RII-20.