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May 22, 2014

CPUC Energy Division
Attention: Tariff Unit
California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102

Subject: Reply of Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E) to Protest of Advice Letter 4402-E, 3030-E, and 2592-E, respectively, California Energy Systems for the 21st Century Proposed Research and Development Projects and Cooperative Research and Development Agreement

Dear Energy Division Tariff Unit:

Pursuant to Rule 7.4.3 of the California Public Utilities Commission's (CPUC or Commission) General Order (GO) 96-B, Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E), collectively referred to as the Joint Utilities) hereby respectfully submit its reply to the protest to Advice Letter (AL) 4378-E submitted by the Office of Ratepayer Advocates (ORA). As discussed in more detail below, the Joint Utilities respectfully request that the Commission reject ORA's protest.

Background

In Decision (D.) 14-03-029, the California Public Utilities Commission (Commission) approved a modification to the California Energy Systems for the 21st Century (CES-21) Program. In this Decision, the Commission directed the Joint Utilities to file for approval of the CES-21 multi-year research and development projects and the Cooperative Research and Development Agreement (CRADA).¹ On April 25, 2014, the Joint Utilities filed this Advice Letter (AL 4402-E, et al).

On May 15, 2014, ORA submitted a protest to the Joint Utilities' Advice Letter. No other party has protested the Advice Letter.

¹ D. 14-03-029, Ordering Paragraphs 13, 14, and 15.

Response to Protests

In its protest of the Joint Utilities' advice letter 4402-E, et al, ORA recommends that the Commission:

1. Order the Joint Utilities to supplement the Machine to Machine Automated Threat Response ("MMATR") cyber security project to include a more clear implementation plan, budget, and schedule with deliverables and milestones;
2. Order the Joint Utilities to supplement the Advice Letter to describe how the MMATR proposal complements and/or leverages all other utility cyber security programs and projects; and
3. Deny the Flexibility Metrics and Standards Grid Integration Project.

The Joint Utilities request that the Commission reject ORA's protest for the reasons stated in the sections below.

A. Contrary to ORA's protest, the Joint Utilities have presented detailed implementation information about the MMATR cyber security project in the Advice Letter and present further information in response to ORA below.

1. The Joint Utilities have provided a clear implementation plan for the MMATR cyber security project

In the Advice Letter, the Joint Utilities provided a clear and comprehensive proposed research project business case. This business case included a description of the project, research approach assessment, and implementation plan and schedule. Contrary to ORA's assertion in its protest, the level of detail provided was similar to the Advice Letter submitted on April 19, 2013.

This information can be found throughout the original filing, including Attachment 1 of the advice letter (CES-21 Proposed Research and Development Project Business Cases) at pages 9-12 and Attachment 2 (CES-21 [Draft] CRADA) at pages 4-6 and pages 10-11 of Attachment A to the CES-21 [Draft] CRADA (Statement of Work). While the Joint Utilities will commit to briefing ORA upon completion of the CRADA and support their informational needs, this Advice Letter fully satisfied the requirements as stated in D.14-03-029.

The MMATR cyber security research and development project is divided into three phases, including background cyber security research, algorithm and tool development, and reporting. As required by D.14-03-029, the Joint Utilities will provide status updates on the project as part of the CES-21 annual reports filed by March 31 of each program year. Because the CES-21 Program is a research and development program, the Joint Utilities prudently will adjust the milestones

and deliverables, along with estimated completion dates, to reflect to ongoing results of the project.

The three CES-21 utility project managers will coordinate with LLNL, administer the CES-21 Program and the CRADA, and ensure that the CES-21 Program stays within the authorized budget.

2. Contrary to ORA's protest, the MMATR project complements and leverages the Joint Utilities' current cyber security efforts

The Joint Utilities have exercised extensive due diligence in coordinating with national R&D leaders in the electric grid cyber security area. In its effort to learn about work that is complementary to CES-21, the Joint Utility team visited the Pacific Northwest National Laboratory and the Idaho National Laboratory and had discussions with Sandia National Laboratories, Lawrence Berkeley National Laboratory, and Oak Ridge National Laboratory. The team has also evaluated electric grid cyber security work being performed by various universities under the Trustworthy Cyber Infrastructure for the Power Grid (TCIPG) umbrella and solicited feedback and project "deconfliction" from the Electric Power Research Institution (EPRI). Additionally, the project team has coordinated the development of the MMATR business case with the Department of Energy's Office of Electricity Delivery & Energy Reliability (DOE OE) to ensure that proposed work is non-duplicative and fulfills needed R&D as detailed in DOE OE's Roadmap to Achieve Energy Delivery Systems Cybersecurity.²

Contrary to ORA's protest, the Joint Utilities' MMATR project does not duplicate the Cyber-intrusion Auto-response and Policy Management System (CAPMS). CAPMS is a ViaSat project being performed under DOE contract with SCE and Duke Energy providing technical advice, assistance and required cost share. This project is specific to extending the policy management capabilities within ViaSat's Common Cybersecurity Services (CCS) software applications. In contrast, the CES-21 MMATR project is designed to broadly address aspects of California's electric grid and research approaches for vendor-neutral automatic machine response to all manner of cyber threats. It is hoped that the research from CES-21 will result in the definition of a standard language for instructing cyber devices that could be leveraged by ViaSat and other commercial vendors to improve grid security throughout the US. These efforts are not only non-duplicative they are synergistic and leverage external resources to the benefit of California ratepayers.

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http://energy.gov/sites/prod/files/Energy%20Delivery%20Systems%20Cybersecurity%20Roadmap_finalweb.pdf

A robust cybersecurity regime is crucial to maintaining the reliability and resilience of the nation's electric grid and equally, to the Joint Utilities' electric infrastructure. The same defense-in-depth approach the Joint Utilities use to protect their corporate computer network and systems is being applied to the grid network to provide a flexible framework for improving cybersecurity defenses. However, as technology continues to advance, the complexity of security threats also continues to advance, and the Joint Utilities' efforts to defend against them must also advance. The Smart Grid Cybersecurity Project, described in the SCE Annual Report on the Status of Smart Grid Investments (2013), focusses on state of the art protection mechanisms as they exist today. The Viasat CAPMS and CES-21 MMATR projects complement and do not duplicate each other in their focus on advancing the state of the art in an attempt to keep pace with the threats.

Contrary to ORA's protest, PG&E's Advanced Detection and Analysis of Persistent Threats (ADAPT) Cyber Security Project has leveraged commercial products to strengthen PG&E's capabilities to detect and respond to a class of threats referred to as Advanced Persistent Threats (APT). While these capabilities are necessary, they are considered reactive, as they are primarily signature based. The Joint Utilities' MMATR proposal complements and does not duplicate the ADAPT capabilities as it moves detection and response capabilities from signature based to heuristic, anomaly, reputation, patterns, and self-learning to provide a predefined automated response base on respective risk tolerances.

For SDG&E, none of the existing cyber security efforts or projects approved in its GRCs or outlined in its approved Smart Grid deployment plan are designed to address the research and development proposed in the CES-21 MMATR project. While MMATR is designed to build on core capabilities of the California Joint Utilities, it is unique and very unlikely to be found in a commercial product. It is designed to allow information to be derived from other security projects and to provide additional data sources to enhance threat intelligence and operational security of Industrial Control Systems (ICS).

B. Contrary to ORA's protest, the Flexibility Metrics and Standards Grid Integration Project will directly benefit the Commission's and stakeholders' grid integration modeling efforts.

ORA claims that the Joint Utilities do not provide sufficient information to demonstrate that the Flexibility Metrics and Standards Grid Integration Project ("Flexibility Metrics Project") is needed, provides benefit to ratepayers, or adds value to the current and ongoing modeling efforts at the Commission as part of the Long-Term Procurement Planning ("LTPP") proceeding. (ORA Protest, p. 10-12.)

As a threshold matter, much of ORA's protest to the Flexibility Metrics Project appears to repeat ORA's objection to the project during the CES-21 application proceeding, which the Commission rejected. (See D.12-12-031, pp. 42- 48, 55. "Projects limited to these four areas [including grid integration] are consistent with the corporation's resource plan since they all support basic company operations in transmission, distribution, electric grid planning and/or security. Projects in these four areas are highly likely to improve operating efficiency and reliability because the typical use of optimization techniques is to improve operating efficiencies and to improve reliability by identifying weaknesses in electric and gas distribution systems, by more accurately modeling electricity resource needs, and by improving cyber security practices.") As such, ORA's protest is procedurally defective and should be summarily dismissed as an improper subject for a protest to an implementation advice letter.

Nonetheless, assuming that the Commission considers ORA's protest, the following addresses each of the six issues that ORA raises in support of its recommendation that the Commission deny the Flexibility Metrics Project and demonstrates that ORA has no basis for its recommendation.

Issue 1: Contrary to ORA's protest, the Flexibility Metrics Project addresses a real problem recognized by parties in the LTPP and Resource Adequacy (RA) proceedings.

ORA claims that the Flexibility Metrics Project is a research project with no problem to address, and that the Joint Utilities should have collaborated with stakeholders in the LTPP and RA to determine if the Flexibility Metrics Project is necessary or beneficial to the operational flexibility modeling already underway in Commission proceedings.

Contrary to ORA's claim, the Flexibility Metrics Project business case explains in great detail that the current reliability metrics and standards used for planning and procurement decisions in current Commission proceedings were developed for an electric system that does not have much non-dispatchable and intermittent resources, or does not consider the forecast uncertainty and variability of new intermittent generation sources and load. Because there are no flexibility metrics and standards, or analytical tools, generally accepted in the industry to evaluate system adequacy and determine how much flexibility an electric system should have, it is difficult for the Commission to address the system's flexible capacity requirement and need issues in LTPP and RA proceedings. Therefore, there is a real need for the proposed Flexibility Metrics Project, and real benefits to the stakeholders and Commission in the ongoing LTPP and RA proceedings.

In April of this year, PG&E in collaboration with several parties reviewed various planning models that were used in prior LTPP proceedings, or that are being developed to evaluate future system flexibility needs. A report was provided to the

ALJ and all parties of the 2014 LTPP proceedings, and its finding presented at a public workshop in the proceeding.³ The Joint Utilities intend to undertake a similar collaborative approach to consult with Commission staff and experts who can provide input and review deliverables from the Project as they become available. Industry experts could include CAISO, CEC/CPUC staff, TURN, EPRI, LLNL, NREL, and selected model developers. The results and recommendations of the Flexibility Metrics Project could be presented to parties in the LTPP and RA proceedings in the same way that the results of PG&E's collaborative review of planning models was presented to LTPP participants.

Issue 2: Contrary to ORA's protest, the Flexibility Metrics Project business case addresses a real problem recognized by parties in the LTPP and RA proceedings.

ORA contends that the Flexibility Metrics Project business case does not indicate whether the LLNL-CEC work the project would leverage is the same work currently under consideration in the LTPP proceeding and does not describe the status of the LLNL-CEC work, any ratepayer benefits have been achieved as a result of that work, or how additional funding of the Flexibility Metrics Project will result in incremental benefits.

The above statements suggest ORA's lack of familiarity with the business case that the Joint Utilities filed, and lack of understanding of the status of models that parties are likely to use in the LTPP. First, the Flexibility Metrics business case explains how the project may use the weather model developed by LLNL (Business case, Phase 2) assuming this model is selected to evaluate possible flexibility metrics in Phase 1. Second, the LLNL-CEC modeling work is not being considered for use by parties in the 2014 LTPP. The LLNL-CEC work is currently undergoing peer review. As explained in Section 8 of the Flexibility Metrics business case, the benefits of the Project are multiple, and were recognized by the Commission in Decision 12-12-031. ORA was an active party in that proceeding, and argued unsuccessfully the same point about the benefits of additional funding for the Flexibility Metrics Project.

Issue 3: Contrary to ORA's protest, the Flexibility Metrics Project is not duplicating work done by others.

The third issue that ORA raises is that the Flexibility Metrics Project business case does not provide sufficient showing that the project is not duplicative of work being done by other entities, or of the CEC's April 29, 2014 EPIC proposal to "Develop

³ A copy of the collaborative report can be found at:
http://www.cpuc.ca.gov/NR/rdonlyres/ECE43E97-26E4-45B7-AAF9-1F17B7B77BCE/0/CombinedLongTermProcure2014OIR_Report_CollaborativeReview.pdf

Innovation Tools and Strategies to Increase Predictability and Reliability of Wind and Solar Energy Generation.” (ORA Protest, p.11-12.)

ORA appears to misunderstand the Flexibility Metrics business case and the proposed CEC EPIC work. The proposed CEC work is intended to improve forecasting and modeling tools for wind and solar generation. In contrast, the Flexibility Metrics Project is intended to provide metrics and tools to determine the system's operating flexibility needs. Weather uncertainty and its impact on renewable generation is an input to the evaluation of the system's operating flexibility needs. The projects are not similar. Both, improvements in renewable generation forecasting and the development of metrics and tools to determine the system's operating flexibility needs, are important and beneficial to customers.

As referenced in Section 1h of the Flexibility Metrics business case, the project team completed due diligence to ensure no undue duplication of research with others. As part of that process, the CEC provided a letter stating that it had found no duplication of work with planned EPIC activities and that it recognized the importance of flexibility metrics to assess the adequacy of the system with more renewables in the resource mix. A copy of the CEC letter is provided as an attachment to this response to ORA's protest.

Issue 4: Contrary to ORA's protest, the Flexibility Metrics Project business case explains how the results from the Project can be used by the Commission and other parties.

ORA argues that the business case does not explain how the Flexibility Metrics Project's results will be used by the Commission and stakeholders once completed. Contrary to ORA's assertion, the Project's business case explains in Section 8 that the results from this project will facilitate the consideration and decision making in regulatory and stakeholder processes of planning issues related to the integration of renewable resources, including: (1) quantification of system operating requirements, (2) estimates of the contribution of different resources to meet those requirements, (3) quantification of system residual need for resources, and (4) evaluation of the cost-effectiveness of resources alternatives with different operating attributes to meet residual system needs. The LTPP and RA proceedings are the most likely venues where the benefits of this project can be realized. The sooner the proposed project is approved, the earlier that this project could benefit Commission's decisions in LTPP and RA proceedings. ORA is correct that the schedule of the ongoing LTPP makes it difficult for the project to benefit the ongoing Phase 1A of the LTPP proceeding, but it is not too late for future LTPP proceedings. The LTPP proceeding occurs every two years and the RA proceeding every year, so there are plenty of opportunities for the Commission to take advantage of the improvements in flexibility metrics and tools developed by the proposed business case. As discussed above, the Joint Utilities intend to use a

collaborative approach and share the results and recommendations of the Project with participants in the LTPP and RA proceedings.

Issue 5: Contrary to ORA's protest, the Flexibility Metrics Project will develop metrics and tools that the Commission and other parties can use with their own preferred assumptions in different venues.

ORA claims that the Flexibility Metrics business case fails to identify and explain what assumptions the Project will use. The Joint Utilities recognize that inputs or assumptions are important for any analysis. However, ORA misses the point. The Flexibility Metrics Project is intended to develop new operating flexibility metrics and analytical tools that have multiple uses, not to quantify results for a single use. Just as loss of load and planning reserve margin metrics have been around for many years to measure system reliability, the flexibility metrics that this project proposes to develop will be useful for multiple evaluations of system adequacy and need quantifications. The flexibility metrics and standards that are developed as part of the Flexibility Metrics Project can be used with different assumptions that the Commission and other parties choose to use in the future.

Issue 6: Contrary to ORA's protest, the CES-21 partnership gives the Joint Utilities the opportunity but not the obligation to use LLNL's supercomputers for the Project.

ORA claims that the Joint Utilities do not provide a compelling justification for the need to use the LLNL's supercomputing capabilities, or explain the potential consequences of relying so heavily on LLNL's supercomputers to execute the Flexibility Metrics Project. The CES-21 partnership gives the Joint Utilities the opportunity to use LLNL's supercomputers. ORA does not appear to have read the business case for the proposed project. The extent to which the Flexibility Metrics Project uses LLNL's supercomputers will be informed by a review of available tools. In addition, LLNL has different computer systems with a range of capabilities from which to choose for the the particular problem at hand. Regardless of which tools are used during the course of the project, there is no expectation that having ongoing super-computing capabilities will be necessary to make future use of the output of this project.

In conclusion, the business case for the Flexibility Metrics Project contains sufficient information to demonstrate that the project is needed, and provides benefit to customers. The above analysis shows that ORA is misinformed or lacks familiarity about the issues it raises and claims it makes in its effort to deny approval of the proposed Flexibility Metrics Project. The Joint Utilities respectfully request that the Commission reject ORA's recommendation and approve the proposed Flexibility Metrics and Standards Project.

Conclusion

Based on the discussion above, the Joint Utilities respectfully request that the Commission reject ORA's protest and approve AL 4402-E, et al. as filed.

Sincerely,

Handwritten signature of Brian Cherry in cursive script.

Vice President, Regulatory Relations

Attachment

cc: President Michael Peevey, CPUC
Commissioner Carla Peterman, CPUC
Commissioner Michel Florio, CPUC
Commissioner Catherine Sandoval, CPUC
Commissioner Michael Picker, CPUC
Timothy Sullivan, Chief Administrative Law Judge, CPUC
Karen Clopton, General Counsel, CPUC
Edward Randolph, Director, CPUC Energy Division
Damon Franz, Supervisor, CPUC Energy Division
Maria Sotero, Analyst, CPUC Energy Division
Chloe Lukins, Program Manager, ORA

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January 21, 2014

Redacted

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Redacted

Dear Mr. Redacted

The California Energy Commission (Energy Commission) reviewed your proposal for *Flexibility Metrics and Standards: Business Case for California Energy Systems for the 21st Century (CES-21)*. The Commission's review has not found any duplication of this work with other projects either from CES-21, planned EPIC activities or other research efforts. You may include this letter when requesting funding.

As California moves forward to achieve RPS goals to include more renewables in the generation mix, planning for the effects of variability will become more important. Metrics are required to measure the flexibility of the power system for use in planning studies. Compared to current generation adequacy metrics, system flexibility assessment will be more data intensive and require more detailed system modeling. The flexibility metrics developed by this project will help assess the system adequacy and provide a measure for determining ramping needs.

Thank you for your interest in coordinating with our research programs.

Sincerely,

A handwritten signature in black ink, appearing to read 'Laurie ten Hope'.

Laurie ten Hope
Deputy Director
Energy Research and Development Division