

**ORA DATA REQUEST  
ORA-SDGE-178-TCR  
SDG&E 2019 GRC – A.17-10-007  
SDG&E RESPONSE  
DATE RECEIVED: APRIL 13, 2018  
DATE RESPONDED: MAY 24, 2018**

**Exhibit Reference:** SDG&E-13, SDG&E-14, and SDG&E-24

**SDG&E Witness:** Alan M. Dulgeroff, Alan F. Colton, and Christopher R. Olmsted

**Subject:** DERMS

**General Notes:** The following questions refer to SDG&E's DERMS program(s) in its entirety, not just the request in the current case. For any questions where ORA is requesting data, provide data for all years data is available, not just 2012-2017.

**Please provide the following:**

1. Provide existing SDG&E documents that describe the objectives, scope (in terms of the geographic deployment, and any excluded regions in SDG&E service territory), and schedule of DERMS development and deployment. If SDG&E does not have existing documents, explain why and provide a narrative response to this question.

**SDG&E Response 01:**

See the accompanying files, "ORA-SDGE-178-TCR Overview – Key Aspects of DERMS.pdf", "ORA-SDGE-178-SDG&E DER Roadmap.pdf", "ORA-SDGE-178-TCR-DERMS - Business Case.pdf" and "ORA-SDGE-178-Wave Project Release Schedule.pdf".

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2. Provide a flow chart and narrative that shows and explains all interactions between DERMS and other SDG&E IT systems, e.g., ADMS, OMS, etc., DER assets, and thirdparty IT systems.

**SDG&E Response 02:**

See the accompanying document, “ORA-SDGE-178-DERMS Distributed Control Hierarchy.pdf”. The dotted lines on the attachment indicate a future integration and the solid lines indicate existing integration/infrastructure. The blue boxes indicate DERMS direct control while the green boxes indicate separate application than DERMS.

DERMS directly controls SDG&E-owned and/or operated DERs, including microgrids. ADMS and SCADA systems are monitored and operated separately from DERMS.

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3. Describe the current status of DERMS development and deployment at SDG&E.

**SDG&E Response 03**

Release 2.4.9 of Wave is in production in the SDG&E datacenter which is applicable to two battery storage systems. Release 2.4.10 of Wave is in production at the datacenter and in Borrego Springs – applicable to the Borrego Springs Microgrid. SDG&E is currently testing release 4.2 prior to a planned 2018 deployment. SDG&E and the vendor, Spirae LLC, are continuing to develop future releases to complete the project scope.

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4. Has SDG&E selected a DERMS system for full deployment? If not, when does SDG&E expect to make this selection? If so:

- a. Describe the DERMS system in terms of vendor, project name/number, and revision number,
- b. Provide the project description, goals, and objectives submitted to the vendor,
- c. Provide vendor documents that describe the DERMS it offers off-the-shelf,
- d. Provide vendor documents that describe the DERMS that will be developed for SDG&E,
- e. Provide a list of other DERMS systems the vendor 1) has deployed at other utilities; and 2) is currently developing for other vendors:

**SDG&E Response 04:**

Yes, SDG&E has selected a DERMS system for full deployment.

- a. Vendor: Spirae, LLC; Project name: DERMS; Revision: Phase 1
- b. A confidential RFI was provided to our vendor. See the accompanying confidential file, "ORA-SDGE-178-Confidential SDGE Smart Grid Project RFI.docx".
- c. See the accompanying confidential file, "ORA-SDGE-178-Confidential-DERMS Use Cases and Associated Projects.xlsx".
- d. See the accompanying confidential file, "ORA-SDGE-178-Confidential-Wave DERMS Product Suite.docx".
- e. **This response contains Confidential and Protected Materials Pursuant to PUC Section 583, GO 66-D, and D.17-09-023. Confidential information has been shaded in yellow.** The list of other utilities and other vendors that Spirae provides DERMS systems to is confidential and provided below.

[Redacted content]

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5. List the DERMS vendors SDG&E evaluated before selecting a vendor, the scoring criteria used in the evaluation, and scoring results.

**SDG&E Response 05:**

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SDG&E evaluated the following vendors, Spirae, Alstom, Siemens, Lockheed Martin, General Electric, Green Energy. See the accompanying document, “ORA-SDGE-178-Confidential-Scoring Criteria.xlsx”. The scoring results were as follows:

Vendor	Raw Score	Weighted Score
Spirae	█	█
Alstom	█	█
Siemens	█	█
Lockheed Martin	█	█
General Electric	█	█
Green Energy Corp.	█	█

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6. Please explain why a different budget code for DERMS was used in the last three rate cases and on the WOA previously provided to ORA: TY 2012 – BC 10875.0; TY 2016 – BC 10875M; TY 2019 – BC 14860A; WOA dated 11/20/13 – BC 13256.

**SDG&E Response 06:**

Budget 13256 was originally created when this project initiated in the Smart Grid portfolio at the time of the GRC filings. The project was subsequently moved into IT capital (Budget 14860) and this remains as the only active budget code. Budget 10875 was initially created in 2010 and at the time of the GRC filings, IT business planners were placing all Smart Grid projects under that code because they track projects through project codes, not budget codes. Budget 14860 is the only current budget code open and active.

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7. Provide SDG&E's annual recorded expenditures, by year, for DERMS development and deployment. Provide these expenditures per the budget code to which they were recorded.

**SDG&E Response 07:**

Expenditures were recorded from budget 14860, in nominal dollars.

2013: \$127,613 (\$128,503 w/AFUDC)  
2014: \$4,906,032 (\$5,104,466 w/AFUDC)  
2015: \$3,072,211 (\$3,575,615 w/AFUCD)  
2016: \$2,341,844 (\$3,127,120 w/AFUDC)  
2017: \$2,261,423 (\$2,836,273 w/AFUDC)

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8. The WOA provided to ORA in response to data request ORA-SDGE-141-TCR Q.7c is over four years old.

- a. Is this the most current WOA? If not, provide the most recent WOA.
- b. Can the budget for a project be changed without generating a revised WOA? If so, describe this process.
- c. Is the budget shown in the 2013 WOA the current project budget? If not please explain. If so, explain why this value is different from the \$57.4 million value in SDG&E's TY 2012 testimony.

**SDG&E Response 08:**

- a. Yes, it is the most current WOA.
- b. Yes, the budget can be changed without generating a revised WOA. Revised WOAs are submitted for anything over or under 10% of the current WOA.
- c. The budget shown in the 2013 WOA was based on updated information at the time the project team was narrowing down scope and selecting a vendor.

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9. Describe the scope of work to be performed and SDG&E’s objectives for DERMS during the current rate case cycle including attrition years, 2017-2021.

**SDG&E Response 09:**

One of SDG&E’s objectives for DERMS is for it to become the enterprise solution to control DER, giving operators the ability to control resources regardless of DER manufacturer, integrator, or resource type. The scope of the DERMS project includes:

- Deploying DERMS as a microgrid controller to give SDG&E DER operators the ability to remotely operate the Borrego Springs Microgrid, including real time optimization.
- Deploying DERMS to SDG&E’s energy storage systems (specifically: Canyon Crest, Ortega, Pala, ITF, Del Lago, Miguel, Borrego), to enable SDG&E DER operators to remotely monitor and control SDG&E’s battery fleet (single asset or groups of assets) in their native modes, including base mode, state of charge management, peak shave, PV smooth, frequency regulation, power factor control and voltage regulation; additionally, the ability to schedule reservations (including detailed scripts), and view/clear alarms on the assets.

See the accompanying files, “ORA-SDGE-178-SDG&E DER Roadmap.pdf” and “ORA-SDGE-178-Wave Project Release Schedule.pdf” provided in response to question ORA-SDGE-178 Question 1.

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10. Provide SDG&E's current cost estimate for full deployment of DERMS.

**SDG&E Response 10:**

Full deployment is estimated at approximately \$20.5 Million, including AFUDC.

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11. Provide the analyses, reports, and data that support that the total cost forecast of full DERMS deployment provided in response to question 10 above is reasonable.

**SDG&E Response 11:**

A breakdown of costs to question 10 is shown below. No analysis, reports or data was utilized as the vendor selection process was a means to achieve some confidence that the costs would be reasonable.

Actual cost: \$15.03M (includes AFUDC)

Amount remaining: \$1.72M (without AFUDC).

Description of estimates:

DERMS vendor: \$275,000

Test & Infrastructure Mgmt: \$475,000

RTDS model development and support: \$50,000

Labor: \$920,000 (includes loaders)

AFUDC: ~\$550,000

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12. For BC 14860A, DERMS, SDG&E workpapers indicate a sub-category of “technical obsolescence.” Does this indicate that DERMS is intended to replace obsolete equipment or software systems? If not, please explain. If so, provide a list of the obsolete equipment DERMS will replace.

**SDG&E Response 12:**

No, technical obsolescence does not indicate that DERMS is intended to replace obsolete equipment or software systems. DERMS is a new software system and is not intended to replace an existing system.

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13. For BC 14860A, DERMS, SDG&E workpapers imply that SDG&E is developing a DERMS with the requested funds, rather than purchasing and implementing a commercial product or system. Is this correct? If so, provide the analysis that led SDG&E to develop rather than purchase a DERMS.

**SDG&E Response 13:**

Yes, SDG&E is developing a DERMS with the requested funds, rather than purchasing and implementing a commercial product or system. SDG&E's evaluation of current systems concluded that none of the vendors were able to meet SDG&E's requirements for a commercial DERMS product or system; all vendors would have required significant customization or development to meet SDG&E's needs. In 2013, SDG&E issued an RFI to 20 vendors for a DERMS product. 16 vendors responded. SDG&E narrowed down the list to 6 vendors for bidder demos. SDG&E focused on the strongest two candidates and conducted site visits with those vendors. The attached slide shows a summary of the vendor selection process, and a comparison between SDG&E's top two vendors. Both vendors required significant customization and development to meet SDG&E's needs.

See the accompanying confidential document, "ORA-SDGE-178-Confidential - Vendor Selection Process Review.pdf".

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14. For BC 14860A, DERMS, SDG&E workpapers states that the DERMS SDG&E proposes to develop will support price-driven system management. Does this mean the DERMS will support a distribution system operator (DSO.) If not, please explain. If so, provide examples of DERMS operations that will support a DSO.

**SDG&E Response 14:**

Yes, DERMS will support a DSO by peak shaving, load shifting, load firming, Volt/VAr management, state of charge management, market participation, using DER to mitigate planned and unplanned outages on the grid.

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15. Has SDG&E received any public funding to support DERMS development?

**SDG&E Response 15:**

Yes, SDG&E has received public funding to support DERMS development from the California Energy Commission (CEC).

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16. For BC 14860A, DERMS, list any completed, in process, or pending development or demonstration projects that SDG&E has been involved in that relate to DERMS, or that could provide information relative to the development and implementation of a DERMS. Provide the following for each project:

- a. Project name,
- b. Project objective,
- c. Project status,
- d. Project authority, e.g. EPIC, R.14-08-013, etc.,
- e. Budget by funding source, e.g. ratepayers, DOE, etc,
- f. Estimated completion date.

**SDG&E Response 16:**

SDG&E is continuing its work of advancing DERMS, as the majority of projects needed to transform the distribution system into a “smart grid” are associated with DERMS (i.e. SCADA Enhancements, Integrated Test Facility, etc.)

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17. For BC 14860A, DERMS, describe the scope of the project in terms of equipment included in the project, for example computer software, computer hardware, communication systems, field interface devices, etc.

**SDG&E Response 17:**

For budget code 14860A, the scope includes the following:

- Computer software (Wave field system, Wave datacenter system, Wave client, RTDS model simulation)
- Computer hardware (datacenter servers, field appliances and servers, test lab servers and clients, RTDS)
- Field interface devices (Field gateway, test gateways, Phasor Data Concentrator)

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18. Does DERMS requires new equipment or equipment upgrades that are not included as part of BC 14860A, or other DERMS budget codes? If so, describe these equipment changes and provide budget codes and/or cost estimates for this other equipment.

**SDG&E Response 18:**

The DERMS project is dependent on the Real Time Digital Simulator (RTDS) for testing software and hardware against asset and circuit models prior to safely deploying to the field. The RTDS racks used by DERMS cost approximately \$500,000. Part of the DERMS project is dependent on equipment and infrastructure upgrades at the Borrego Springs Microgrid, which is part of the Borrego Springs 2.0 project, Budget Code 14243.

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19. In a 2014 workshop presentation, SDG&E indicated that DERMS “will talk directly to Smart Inverters to manage local issues and deliver system commands” and “issue set points to Smart Inverters.”<sup>1</sup> However, through ORA participation in various working groups supporting the DRP proceeding and Smart Inverters, ORA understands that DERMS is intended to only communicate with DER aggregators, not individual Smart Inverters. Describe the types, sizes, and other characteristics that define which DER and will not to be monitored and controlled by SDG&E’s proposed DERMS, and which will not. Specifically:

- a. The types of DER, for example solar systems, demand response assets, storage systems, and electric vehicle chargers.
- b. The scale of DER, for example individual electric vehicles and residential rooftop solar systems, DER aggregators, only large DER systems (e.g. > 100 kW or 1 MW.)
- c. Any other limitations or exclusions from the concept that DERMS will allow SDG&E to monitor and control all DER deployed, and to be deployed in SDG&E’s service territory.

**SDG&E Response 19:**

- a. Currently, SDG&E is only focusing on Energy Storage (including ultracapacitor), Diesel Generators, and one PV system that is part of the Borrego Springs Microgrid. At present, only assets that are under SDG&E operations/control are being considered for integration with DERMS.
- b. SDG&E does not have a minimum or maximum size “rule” for the DER to be integrated with DERMS. SDG&E is prioritizing larger energy storage (~25kW–2000kW) systems that are owned and/or operated by SDG&E.
- c. SDG&E is prioritizing existing and planned SDG&E owned/operated DER for DERMS integration in a phased approach. SDG&E does not currently have a plan to integrate customer-owned and operated DER with DERMS, with the exception of the NRG PV system that’s part of the Borrego Springs Microgrid, which SDG&E is able to control as part of the Borrego Springs Microgrid, using DERMS.