

PUBLIC UTILITIES COMMISSION

505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298



November 3, 2022

SDG&E Advice Letter 4063-E
SCE Advice Letter 4851-E
PG&E Advice Letter 6687-E

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SUBJECT: Joint Utility Evaluation Process and Criteria to Assess Microgrid Different Isolation Technologies Pursuant to Final Resolution E-5194 and Decision 21-01-018

Dear Mr. Anderson, Mr. Flanigan, Ms. Kaushik, and Mr. Jacobsen,

This disposition letter approves, effective October 26, 2022, San Diego Gas & Electric Company (SDG&E) Advice Letter (AL) 4063-E, Southern California Edison Company (SCE) AL 4851-E, and Pacific Gas and Electric Company (PG&E) AL 6687-E, as revised by the substitute sheet filed on October 5, 2022.

On September 12, 2022, the California Energy Storage Association (CESA), the California Solar & Storage Association (CALSSA), and Tesla, Inc. (Tesla) filed timely protests to the advice letters.

Attachment A contains background on the advice letters, protests, replies, and staff's determination.

Mr. Anderson, Mr. Flanigan, Ms. Kaushik, and Mr. Jacobsen

October 26, 2022

Page 2

Please contact Patrick Saxton at Energy Division at patrick.saxton@cpuc.ca.gov if you have any questions.

Sincerely,



Leuwam Tesfai

Deputy Executive Director for Energy and Climate Policy/

Director of Energy Division

California Public Utilities Commission

cc: Service List for R.19-09-009

Jason Ortego, Energy Division

Jin Noh, California Energy Storage Alliance, jnoh@storagealliance.org

Brad Heavener, California Solar & Storage Association, Brad@calssa.org

Andy Schwartz, Tesla, Inc., anschwartz@tesla.com

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Attachment A

Background

Decision (D.) 21-01-018 Ordering Paragraph (OP) 9 requires SDG&E, SCE, and PG&E (individually a “Utility” and collectively, the “Joint Utilities”) to each file a Tier 2 AL defining the criteria and process for evaluating the safety and reliability of electric isolation technologies prior to deployment or implementation of the technologies.

On April 6, 2021, the Joint Utilities timely filed SDG&E AL 3734-E, SCE AL 4462-E, and PG&E AL 6153-E proposing a common evaluation criteria and process “to develop a pathway for diverse technologies to support disconnection of a premise’s entire electrical service to support electrical isolation during a wider grid outage.”¹ On April 26, 2021, multiple protests were timely filed. On May 3, 2021, the Joint Utilities filed a timely reply to protests.

On July 29, 2021, the Joint Utilities submitted supplemental advice letters (SDG&E AL 3734-E-A, SCE AL 4462-E-A, and PG&E AL 6153-E-A) replacing the original advice letters in their entirety. Energy Division re-opened the comment period on the supplemental advice letters.

On August 25, 2021, the Joint Utilities submitted supplemental advice letters (SDG&E AL 3734-E-B, SCE AL 4462-E-B, and PG&E AL 6153-E-B) replacing the advice letters in their entirety.

On August 30, 2021, multiple protests to the supplemental advice letters were timely filed. On September 7, 2021, the Joint Utilities filed a timely response to protests.

On June 23, 2022, the Commission adopted Resolution E-5194 approving, with modifications and clarifications, SDG&E AL 3734-E-B, SCE AL 4462-E-B, and PG&E AL 6153-E-B. OP 2 of Resolution E-5194 required the Joint Utilities to each file a Tier 1 AL within 60 days the adoption of the Resolution, making modifications and clarifications as directed in Findings 9, 10, 11, 12, 13, 14, 16, and 20 of Resolution E-5194.

On August 22, 2022, the Joint Utilities timely filed SDG&E AL 4063-E, SCE AL 4851-E, and PG&E AL 6687-E (“Joint AL”) as required by OP 2 of Resolution E-5194.

Protests

On September 12, 2022, the California Energy Storage Association (CESA), the California Solar & Storage Association (CALSSA), and Tesla, Inc. (Tesla) filed timely protests to the Joint AL. All three protests objected to modified language in the Joint AL Attachment A – Supplier Technical Checklist, Table 1 – Devices and Standards, where the Joint Utilities proposed to strike “UL 414: Safety Meter Sockets Standard, updated in 2020 for heat rise test” and to insert “UL 414: Updated

¹ D.21-01-018, Conclusion of Law 20, at 108-109.

in 2022 with revision to Supplement SB – Meter Socket Adapters for Use with Distributed Generation Equipment.” All three protests:

- Identified that the UL 414 update occurred in June 2022;
- Asserted it is unreasonable for the Joint Utilities to immediately require certification to the updated standard;
- Identified there is typically a period of 12 to 24 months before certification to an updated national standard is required by a Nationally Recognized Testing Laboratory (NRTL); and
- Requested that the Commission reject the modification to the UL 414 verbiage proposed in the Joint AL.

Tesla and CALSSA suggested the Table 1 language refer to UL 414 without reference to a specific edition or version of UL 414. CESA suggested the Commission require the Joint Utilities to accept certifications to UL 414 updated in 2020 for a period of two years from the effective date of the Joint AL.

Joint Utilities Reply to Protests

On September 19, 2022, the Joint Utilities filed a timely reply to the three protests received. The Joint Utilities agreed to remove reference to a specific edition or version of UL 414 so that the verbiage in Attachment A Supplier Technical Checklist, Table 1 – Devices and Standards would read “UL 414: Safety Meter Sockets Standard.”

On October 5, 2022, the Joint Utilities filed a substitute sheet for the Joint AL, modifying the verbiage in Attachment A Supplier Technical Checklist, Table 1 – Devices and Standards to read “UL 414: Safety Meter Sockets Standard.”

Discussion

Commission staff has reviewed the Joint AL, the CESA, CALSSA, and Tesla protests, and the Joint Utilities reply to protests. The protests correctly identify there is typically a period of 12 to 24 months before an updated national standard becomes effective. The effective date of a national standard is determined by an NRTL or a Standards Development Organization. At least two NRTLs have publicly accessible webpages to announce the effective date of an updated national standard.²

At the time of this disposition letter, neither UL Solutions nor Intertek has published an effective date for the UL 414, updated June 22, 2022, standard; however, it is reasonably expected the effective date would be no earlier than June 22, 2023, and could be as late as June 22, 2024.³ It would be unreasonable for a Utility to require certification to an edition or version of a national standard that is not yet effective.

² Welcome to the UL Industry File Review Website, <https://ifs.ul.com/ifr/ifr.nsf> (last visited Sep. 23, 2022) and Intertek Standards Update Notices (SUN), <https://www.intertek.com/standards-updates/> (last visited Sep. 23, 2022).

³ UL Solutions was formerly UL LLC which was formerly Underwriters Laboratories.

The substitute sheet for the Joint AL removed the reference to a specific edition or version of UL 414, rendering moot the issue raised in the three protests. Commission staff finds the Joint AL, as revised by the substitute sheet filed on October 5, 2022, complies with the requirements in OP 2 of Resolution E-5194.

Disposition

Energy Division finds that SDG&E AL 4063-E, SCE AL 4851-E, and PG&E AL 6687-E, as revised by the substitute sheet filed on October 5, 2022, meet the requirements established in Ordering Paragraph 2 of Resolution E-5194 and approves them effective October 26, 2022.



Clay Faber – Director
Regulatory Affairs
8330 Century Park Ct
San Diego, CA 92123

CFaber@sdge.com

August 22, 2022

ADVICE LETTER 4063-E

San Diego Gas & Electric Company (U 902-E)

ADVICE LETTER 6687-E

Pacific Gas & Electric Company (U 39-E)

ADVICE LETTER 4851-E

Southern California Edison Company (U 338-E)

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

SUBJECT: JOINT UTILITY EVALUATION PROCESS AND CRITERIA TO ASSESS MICROGRID DIFFERENT ISOLATION TECHNOLOGIES PURSUANT TO FINAL RESOLUTION E-5194 AND DECISION 21-01-018

PURPOSE

San Diego Gas & Electric Company (SDG&E), Southern California Edison Company (SCE) and Pacific Gas and Electric Company (PG&E) (individually a “Utility” and collectively, the “Joint Utilities”) submit this Tier 1 advice letter (AL) in compliance with the requirements of Final Resolution E-5194 to define the criteria and evaluation process to assess different isolation technologies, including utility-scale technologies capable of handling California’s complexity and diversity as specified by Decision (D.) 21-01-018.

On June 23, 2022, the Commission adopted Resolution E-5194, approving with modifications and clarifications Advice 3734-E-B et al. from the Joint Utilities. This Advice Letter complies with Ordering Paragraph (OP) 2 of Resolution E-5194, which requires the Joint Utilities to file a Tier 1 Advice Letter within 60 days of the adoption of Resolution E-5194 addressing the modifications and clarifications in Findings 9, 10, 11, 12, 13, 14, 16, and 20 of that Resolution.

BACKGROUND

On September 12, 2019, the Commission initiated Rulemaking (R.) 19-09-009 to design a framework for the commercialization of microgrids in accordance with Senate Bill (SB) 1339 and to account for the Commission’s commitment to technologies and activities that may be useful for achieving overall resiliency goals.

The *Assigned Commissioner's Scoping Memo and Ruling for Track 1* divided the proceeding into three tracks.¹ Track 1 encompasses the Commission's goal of deploying resiliency solutions in areas that are prone to outage events and wildfires, with the goal of putting some microgrid and other resiliency strategies in place by spring or summer 2020, if not sooner.^{2,3} Track 2 of the proceeding addressed standards, protocols, guidelines, methods, rates, and any tariffs needed to support and reduce barriers to microgrid deployment statewide, while prioritizing system, public, and worker safety, and avoiding cost shifts between customers.

On July 23, 2020, the assigned Administrative Law Judge issued a ruling with a proposal prepared by the Commission's Energy Division, titled, *Facilitating the Commercialization of Microgrids Pursuant to Senate Bill 1339* (Staff Proposal). The Staff Proposal recommended requiring the utilities to develop a pilot program to evaluate the safety and reliability of utilizing low-cost methods to provide electrical isolation for backup power applications and to identify and propose solutions for any implementation and deployment issues.⁴

On January 21, 2021, the Commission issued the Decision adopting microgrid rates, tariffs, and rules to facilitate the commercialization of microgrids pursuant to SB 1339. The Decision's OP 9 adopts the Staff Proposal's recommendation, with modification, by requiring the utilities to evaluate low-cost, reliable electrical isolation methods.

Within 30 days of issuance of the Decision, OP 9 required the utilities to file Tier 2 advice letters that proposed criteria and an evaluation process to assess different technologies to isolate customer premises "[t]o safely provide backup power from distributed generation or a storage resource to customer loads during a wider grid outage..."⁵ In addition, the Decision encourages coordination and collaboration between the Joint Utilities on evaluation plans to reduce the potential for duplicative efforts.⁶

On April 6, 2021, the Joint Utilities jointly submitted an advice letter ("Advice 3474-E et al.") that proposed a common evaluation criteria and process "to develop a pathway for diverse technologies to support disconnection of a premise's entire electrical service to support electrical isolation during a wider grid outage," pursuant to Section 3.5.3 of the Decision.⁷ Advice 3474-E et al. proposed evaluation criteria and a process that would help ensure that the evaluations and assessments are open, transparent, and subject to equitable treatment of different technologies and suppliers on a non-preferential basis, and that the evaluations also include utility-scale technologies capable of handling California's complex and diverse customer needs safely and reliably, as required by the Decision.

¹ *Assigned Commissioner's Scoping Memo and Ruling for Track 1* (issued in R.19-09-009 on December 20, 2019), at 2.

² *Id.* at 3.

³ On June 11, 2020, the Commission adopted Decision (D.) 20-06-017 that included a number of requirements to accelerate the interconnection of resiliency projects in advance of the upcoming wildfire season; modernize tariffs to maximize social resiliency benefits; and promote collaborative engagement between utilities and local and tribal governments.

⁴ Administrative Law Judge's Ruling, July 23, 2020, Attachment 1 – Staff Proposal, at 24.

⁵ Decision, Finding of Fact 28, at 105.

⁶ Decision, at 79.

⁷ *Id.*, Conclusion of Law 20, at 108-109.

On July 29, 2021, the Joint Utilities submitted a supplemental advice letter (Advice 3734-E-A et al.) to Advice 3734-E et al. That supplemental advice letter replaced the original Advice 3734-E et al. in its entirety.

On August 25, 2021, the Joint Utilities submitted a supplemental advice letter (Advice 3734-E-B et al.) to Advice 3734-E et al. and 3734-E-A et al. Advice 3734-E-B et al. replaced Advice 3734-E and 3734-E-A et al. in their entirety.

On June 23, 2022, the Commission adopted Resolution E-5194, approving with modifications and clarifications Advice 3734-E-B et al.

DISCUSSION

This Advice Letter addresses the modifications and clarifications directed in Findings 9, 10, 11, 12, 13, 14, 16, and 20 of Final Resolution E-5194. It also includes additional modifications and clarifications for internal consistency within the modified document, and for further consistency with other item(s) in Final Resolution E-5194, and to reflect appropriate update(s) since Advice 3734-E-B et al. was submitted on August 25, 2021.

Revisions have been made to the final testing and evaluation process, included here as Attachment A. Attachment A to this advice letter was created by copying the text from the **“DISCUSSION – EVALUATION CRITERIA AND PROCESS”** section of Advice 3734-E-B et al, and then modifying that text. Attachment A to this advice letter also includes Attachment A to Advice 3734-E-B et al, the Supplier Technical Checklist, with modifications. Additions are in blue, italicized font. Deletions are in red, strikethrough font.

1. Finding 9

Finding 9 states “It is reasonable to require the proposed evaluation process to be modified to explicitly include front line workers or their representatives.”

Attachment A has been updated to reflect this language.

2. Finding 10

Finding 10 states “It is reasonable to require Attachment A, Table 1 – Devices and Standards to be modified to include California Code of Regulations, title 8, sections 2940.13 (Deenergizing Lines and Equipment for Employee Protection) and 2940.14 (Hazardous Energy Control Procedures).”

Table 1 to the Supplier Technical Checklist has been updated to reflect this language.

3. Finding 11

Finding 11 states “It is reasonable to require the proposed evaluation process be clarified to indicate that consultation with a Standards Development Organization, by a supplier of an electrical isolation technology, is a recommendation only.”

Attachment A has been updated to reflect this language.

4. Finding 12

Finding 12 states “It is reasonable to require the proposed evaluation process be clarified to indicate that submittal of Nationally Recognized Testing Laboratory (NRTL) test data to the utility or repetition, by the utility, of testing already completed by an NRTL will only be required when the utility clearly states why the NRTL certification or testing is inadequate and why the utility needs to examine NRTL test data or repeat NRTL testing.”

Attachment A has been updated to reflect this language.

5. Finding 13

Finding 13 states “It is reasonable to require the proposed evaluation process be clarified to indicate any non-public data submitted to a utility will be treated as confidential by the utility.”

Attachment A has been updated to reflect this language.

6. Finding 14

Finding 14 states “It is reasonable to require the proposed evaluation process be clarified to indicate that any required additional testing beyond NRTL certification will be for a clearly stated purpose by the utility and the utility will define criteria or thresholds for test passage.”

Attachment A has been updated to reflect this language.

7. Finding 16

Finding 16 states “It is reasonable to require the proposed evaluation process be clarified to indicate that customers will retain ownership of customer supplied equipment unless a utility clearly demonstrates a safety-based need for ownership to be transferred to the utility.”

Attachment A has been updated to reflect this language.

8. Finding 20

Finding 20 states “It is reasonable to require the Joint Utilities to include, in any novel agreements between a utility and supplier, the duty, for both the utility and the supplier, to notify each other, the Commission, and the other two utilities, if any safety concerns are found with an electrical isolation device, that was approved under the evaluation process required by D.21-01-018 Ordering Paragraph 9, after it has been installed.”

Attachment A has been updated to reflect this language.

PROTEST

Anyone may protest this Advice Letter to the Commission. The protest must state the grounds upon which it is based, including such items as financial and service impact and should be submitted expeditiously. The protest must be submitted electronically and must be received no later than September 12, 2022, which is 21 days of the date of this Advice Letter was submitted with the Commission. There is no restriction on who may submit a protest.

The protest should be sent via e-mail to the attention of the Energy Division at EDTariffUnit@cpuc.ca.gov. A copy of the protest should also be sent via e-mail to the address shown below on the same date it is delivered to the Commission.

SDG&E: Attn: Greg Anderson
Regulatory Tariff Manager
E-mail: GAnderson@sdge.com & SDGETariffs@sdge.com

PG&E: Erik Jacobsen
Director, Regulatory Relations
c/o Megan Lawson
E-mail: PGETariffs@pge.com

SCE: Connor J. Flanigan
Director, State Regulatory Operations
Southern California Edison Company
E-mail: AdviceTariffManager@sce.com

Tara S. Kaushik
Director, Regulatory Relations
Southern California Edison Company
c/o Karyn Gansecki
E-mail: Karyn.Gansecki@sce.com

EFFECTIVE DATE

This filing is subject to Energy Division disposition and should be classified as Tier 1 pursuant to OP 2 of Final Resolution E-5194. The Joint Utilities respectfully request that this Advice Letter become effective on August 22, 2022, which is the date of this submittal.

NOTICE

A copy of this filing has been served on the Utilities and interested parties shown on the attached list and Service List R.19-09-009, by either providing them a copy electronically or by mailing them a copy hereof, properly stamped and addressed.

Address changes should be directed to SDG&E Tariffs by e-mail at SDGETariffs@sdge.com.

/s/ Clay Faber

CLAY FABER
Director – Regulatory Affairs

Attachments:

- CLEAN Attachment A Revised Evaluation Criteria and Process
- CLEAN Technical Checklist
- REDLINE Attachment A Revised Evaluation Criteria and Process
- REDLINE Technical Checklist



ADVICE LETTER SUMMARY

ENERGY UTILITY



MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)

Company name/CPUC Utility No.: San Diego Gas & Electric (U902)

Utility type:

- ELC GAS WATER
 PLC HEAT

Contact Person: Joff Morales

Phone #: 858-650-4098

E-mail: JMorales@sdge.com

E-mail Disposition Notice to: SDGETariffs@sdge.com

EXPLANATION OF UTILITY TYPE

ELC = Electric GAS = Gas WATER = Water
 PLC = Pipeline HEAT = Heat

(Date Submitted / Received Stamp by CPUC)

Advice Letter (AL) #: 4063-E

Tier Designation: 1

Subject of AL: Joint Utility Evaluation Process and Criteria to Assess Microgrid Different Isolation Technologies Pursuant to Final Resolution E-5194 and Decision 21-01-018

Keywords (choose from CPUC listing): Compliance

AL Type: Monthly Quarterly Annual One-Time Other:

If AL submitted in compliance with a Commission order, indicate relevant Decision/Resolution #: D.21-01-018

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL: N/A

Summarize differences between the AL and the prior withdrawn or rejected AL: N/A

Confidential treatment requested? Yes No

If yes, specification of confidential information: N/A

Confidential information will be made available to appropriate parties who execute a nondisclosure agreement. Name and contact information to request nondisclosure agreement/ access to confidential information:

Resolution required? Yes No

Requested effective date: 8/22/22

No. of tariff sheets: N/A

Estimated system annual revenue effect (%):

Estimated system average rate effect (%):

When rates are affected by AL, include attachment in AL showing average rate effects on customer classes (residential, small commercial, large C/I, agricultural, lighting).

Tariff schedules affected: N/A

Service affected and changes proposed¹: N/A

Pending advice letters that revise the same tariff sheets: N/A

¹Discuss in AL if more space is needed.

Protests and all other correspondence regarding this AL are due no later than 20 days after the date of this submittal, unless otherwise authorized by the Commission, and shall be sent to:

CPUC, Energy Division
Attention: Tariff Unit
Email: EDTariffUnit@cpuc.ca.gov

Name: Greg Anderson
Title:
Utility Name: San Diego Gas & Electric
Address: 8330 Century Park Court, CP32C
City: San Diego
State: California Zip: 92123
Telephone (xxx) xxx-xxxx:
Facsimile (xxx) xxx-xxxx:
Email: GAnderson@sdge.com

Name:
Title:
Utility Name:
Address:
City:
State: California Zip:
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Email:

General Order No. 96-B
ADVICE LETTER SUBMITTAL MAILING LIST

cc: (w/enclosures)

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CA. Public Advocates (CalPA)

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F. Oh

Energy Division

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M. Salinas
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R. Ciupagea
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Tariff Unit

CA Energy Commission

B. Penning
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Advantage Energy

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M. Cade
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Regulatory

Barkovich & Yap, Inc.

B. Barkovich

Biofuels Energy, LLC

K. Frisbie

Braun & Blaising, P.C.

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K. Lucas

Hanna and Morton LLP

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Manatt, Phelps & Phillips LLP

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Stoel Rives LLP

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NRG Energy

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Tariff Unit

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L. Fernandez
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O. Armi

Solar Turbines

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M. Rochman

Southern California Edison Co.

K. Gansecki

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F. Lee

TURN

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UCAN

D. Kelly

US Dept. of the Navy

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Service List

R.19-09-009

August 22, 2022

ATTACHMENT A

**SAN DIEGO GAS & ELECTRIC COMPANY, SOUTHERN CALIFORNIA EDISON
COMPANY AND PACIFIC GAS AND ELECTRIC COMPANY (JOINT UTILITIES)
ELECTRIC EVALUATION PROCESS AND CRITERIA TO ASSESS MICROGRID
DIFFERENT ISOLATION TECHNOLOGIES**

EVALUATION CRITERIA AND PROCESS

A microgrid with a behind the meter (BTM) source allows customers to electrically island and isolate themselves from the Utility¹ being the source. When islanded, BTM generation resources continue to operate and provide power to the premise, which creates a high potential for electrical current to back-feed onto the grid absent an isolation device, or transfer switch.

The potential to back-feed and energize the distribution line cannot be understated. While the Joint Utilities support technologies that allow the customer to self-supply power during a Public Safety Power Shutoff (PSPS) event, if not properly isolated from the grid or a failure occurs by the isolating device, the distribution line could become energized. Such back-feed introduces the same fire potential risk the Joint Utilities are trying to mitigate with PSPS. In addition, the safety of our employees, contractors and the public will depend on the ability for the isolation device to function properly and prevent back-feed of a de-energized distribution line. Visible electrical isolation devices are the Utilities' best way to protect against back-feed to keep our workers and the public safe, especially during drastic conditions when an active PSPS is occurring.

The Joint Utilities support new technologies to enable microgrids that will ensure system, worker, and public safety, in accordance with PU Code §8371(d). However, equipment connected behind the meter and those that physically touch the Joint Utilities' meters on customer premises must be certified to the most current industry standards and codes. Standards development organizations (SDOs)² publish industry standards for a broad range of equipment. The United States Occupational Safety and Health Administration (OSHA) further enforces additional standards that ensure occupational safety for workers.³ In accordance with federal regulations, OSHA maintains a list of Nationally Recognized Testing Laboratories (NRTLs) that test and certify electrical equipment to all applicable national standards.

The Supplier Technical Checklist outlined in Attachment A provides a comprehensive list of the technical requirements that any supplier must provide to the Joint Utilities in order to complete the evaluation process for new isolation technology. In addition to certifications, all device installations must meet National and California Electrical Code requirements, including permitting through the local authority/government with jurisdiction.

¹ San Diego Gas & Electric Company (SDG&E), Southern California Edison Company (SCE) and Pacific Gas and Electric Company (PG&E) are individually referred to as a "Utility" and collectively as the "Joint Utilities."

² Underwriters Laboratories (UL), Institute of Electrical and Electronics Engineers (IEEE), American National Standards Institute (ANSI), National Electrical Manufacturers Association (NEMA), National Fire Protection Association (NFPA), among others.

³ 29 CFR Part 1910.

Joint Utilities will include utility frontline workers or their representatives in the evaluation process.

1. Process for submittal of isolation technology by a third-party to Joint Utilities.

Any supplier that desires to submit isolation technology for evaluation and review by the Joint Utilities must send an email⁴ to the Utilities with the subject line: "Request for Evaluation of Isolation Technology." A supplier submitting a product for Utility evaluation must be well advanced in the design and development and the product must have a high probability of commercialization and only require Utilities' input for evaluation (and not design). In that email, the supplier should provide, among other information:

- full contact information for the supplier, including email, phone number, and physical mailing address;
- state clearly if this technology is being tested with another Utility to ensure appropriate coordination of resources;
- a detailed narrative description of the isolation technology or device;
- proof that such technology or device has received NRTL certification to the most current industry standards adopted by the applicable SDOs. Further, it is recommended the supplier obtain communication from the national standard organization why that standard applies to this technology;⁵
- independent lab testing results justifying the certification and already completed for the electrical isolation technology or device;
- detailed diagrams, manuals, and pictures of the technology or device that can be shared with the Joint Utilities – in a public, non-confidential manner – to allow for better understanding of the product and capabilities;
- proposed relationship with the Utility and customer, and impacts on customer service and experience;⁶ and
- any other information that the supplier believes may be helpful to Joint Utilities in evaluating the technical, safety and operational aspects of the technology or device for use or installation by the respective customers of the Joint Utilities or for use or installation on a utility-scale level.

If a supplier provides information on testing results and/or pilots in other utility territories, including those that are out-of-state, it will be used to help inform the Joint Utilities'

⁴ Upon approval of the advice letter ordered in Resolution E-5194, Ordering Paragraph 2, the Joint Utilities will notice the service list with the advice letter and provide a dedicated email address for each utility for suppliers to submit requests for technology evaluation.

⁵ The supplier should consult with SDOs regarding what standards and test procedures are applicable to the specific technology or device. Consultation with an SDO, by a supplier of an electrical isolation technology, is a recommendation only.

⁶ Utility troubleshooters provide 24/7 customer service. Troubleshooters will be unable to commence field work until customer-owned isolation technology installed at the meter socket is removed.

understanding of the product, but it will not be a substitute for the Joint Utilities' collective or individual testing requirements (see Section 8). In addition to the design of customer electric panels varying between different portions of the country, the Joint Utilities each have customized systems for functional and integration testing designed to meet requirements specific to each Utility. The Commission also has its own General Orders, and the Joint Utilities need to ensure a supplier's product complies with California standards.

To the extent any test data provided to the utility is considered to be confidential by the submitting party, it shall be clearly marked "Confidential" on each applicable page with the specific material considered confidential by the submitting party on each such page highlighted in gray. The utility will treat any such material as confidential, meaning that it will for a period of three years from receipt, keep confidential and take reasonable precautions to protect against the disclosure of the material, except (1) as otherwise agreed by the utility and the submitting party; (2) if the utility is required by law or regulatory authority or otherwise becomes legally compelled (by oral questions, interrogatories, discovery or data requests, subpoena, or similar legal process) to disclose it; or (3) the utility may provide the material to the California Public Utilities Commission (CPUC) pursuant to its rules and regulations governing confidentiality or to any other regulatory agency or administrative agency, under similar protections, if possible, regardless whether the material is formally requested. The ultimate determination of whether documents submitted to the CPUC should remain sealed and non-public is made by the CPUC pursuant to its regulations. The utility will not be liable for any disclosure of any material submitted by a party to the utility if that disclosure is ordered by the CPUC.

2. Required timeframe for Joint Utilities to respond to the suppliers with a specific evaluation plan for the submitted technology.

Within 30 business-days of receiving the required information, the Utility to which the request was submitted will contact the supplier and request any follow-up information needed, start coordinating schedule technical meetings, ask for a demonstration of the technology or device, or make other relevant requests necessary for that Utility to conduct their evaluations of the technology or device. In addition, the Utility will provide the supplier with a draft "test and evaluation" agreement that will include terms and conditions for conducting the evaluation and assessment, modeled on the Commission's requirements for standard technology demonstration projects funded by utility customers under its Electric Program Investment Charge and Smart Grid Pilots decisions.⁷

The proposed 30-business day timeframe for the Utility to contact the supplier and do follow-up is contingent on the number of suppliers requesting evaluation by the Utility at that point in time and contingent on the status of any emergency events. If the Utility has multiple suppliers requesting evaluation of their products simultaneously, the Utility staff will not be able to meet

⁷ See D.20-08-042, at 2-7, summarizing prior CPUC decisions adopting criteria for technology demonstration projects; D.13-03-032, at 6-8, summarizing CPUC criteria for approval of Smart Grid-related pilot technologies under Smart Grid decisions.

the 30-business day timeframe given review of multiple products while conducting their day-to-day work responsibilities. There will need to be some flexibility regarding the timeframe based on the number of suppliers in the queue for evaluation or other operational priorities (e.g., activation of Emergency Operations Centers, mutual assistance and etc.) occurring requiring increased resources to support.

3. Required timeframe for completion of an initial evaluation by Joint Utilities.

Each of the Joint Utilities will notify the supplier via email when it has determined that it has received sufficient information to properly evaluate the technology or device. Unless otherwise noted in the email, each of the Joint Utilities will complete its evaluation and provide its written report on the evaluation within 90 days of the email noting receipt of sufficient information. Each Utility will also keep the supplier reasonably informed about the progress of the evaluation, including any issues that are noted or delays in reviewing submittal.

Each Utility will undertake parallel actions whenever feasible to complete evaluation of a supplier's product. Parallel actions may include, but not be limited to, drafting and review of the testing plans while a supplier completes the NRTL certification, or if the product is already NRTL certified to all applicable UL standards, the Utility can conduct the lab testing and functional and integration testing as described in Attachment A in parallel. While parallel action may be possible, all proposed technologies will continue to be required to meet all of the standards and requirements set forth in this evaluation criteria and process document and Attachment A for certification, whether testing occurs in parallel or in series, to ensure the safety of electric service to customers, employees and the public.

The proposed 90-day timeframe for completing the Utility's evaluation includes consideration of the need to schedule time at Utility testing facilities or an external testing facility at least 30 days in advance and other Commission orders requiring testing of technologies at the Utility laboratories.

An alternative path that a Utility can discuss with suppliers, if requested, would be for the supplier to request and reimburse an independent OSHA-certified lab to perform the utility-required lab testing. However, the Functional and Integration Testing (as described in Attachment A) will need to be performed by each of the Joint Utilities at its respective labs since each has customized systems that will require specific functional testing requirement to meet its end-to-end testing, including different metering technologies.

4. Process for engaging with and providing Joint Utilities feedback to the submitter of the technology.

Consistent with other iterative and collaborative technology evaluations, the Utility and the supplier will reasonably cooperate with each other to complete the evaluation in a reasonable timeframe as described herein. The Utility and the supplier will establish a reasonable schedule of calls, meetings, or other means of providing feedback and progress during the evaluation process. Recognizing that each product will be unique and some will be more complex than others, the Utility will need to tailor engagement with a supplier accordingly to ensure that the technical safety and reliability evaluation can be completed.

As described in Section 7 below, the Joint Utilities' technical evaluation teams are not positioned to assist third parties in the design and development of their products. A supplier submitting a product for Utility evaluation must be well advanced in the design and development of a product, and the product must have a high probability of commercialization.

5. Expectations for engagement by and response to Joint Utilities feedback from submitter of the technology.

During the evaluation process, the supplier may receive requests for additional information and responses to interim test and assessment results from a Utility. The supplier should respond as soon as reasonably practicable given the circumstances, keeping in mind that the evaluation process may be delayed if the supplier is not able to promptly respond.

6. Process for identifying which, if any, standards or safety requirements are applicable and must be certified or tested by a Nationally Recognized Testing Laboratory (e.g., Intertek, UL).

Suppliers shall seek certification at a NRTL to the most current industry standards adopted by the applicable SDO. If needed, the supplier is responsible for asking the SDO, what specific standards would apply that align with their technology or if a new standard needs to be developed. This process should be completed in advance of submittal to one or more of the Joint Utilities, given that the NRTL certification process may yield additional standards or safety requirements certification based on the technology type and its unique characteristics. It is wholly the responsibility of the supplier to demonstrate readiness prior to one or more of the Joint Utilities conducting the evaluations and assessments.

Consultation with a SDO, by a supplier of an electrical isolation technology, is recommended but not required.

When electrical isolation devices or technologies have features or components that may be out of the scope of existing national standards, the Joint Utilities have the ability to question a NRTL's determination of applicability of standards and to acquire the opinion of an SDO or a different NRTL on the applicability of standards.

The submitted technology must comply with the most current applicable standards, such as and not limited to those identified in Table 1 of Attachment A. In addition, the submitted technology must meet OSHA standards to ensure the worker's safety and to identify specific hazardous conditions at the jobsite.⁸

Submittal of NRTL test data to the utility or repetition, by the utility, of testing already completed by an NRTL will only be required when the utility clearly states why the NRTL certification or testing is inadequate and why the utility needs to examine NRTL test data or repeat NRTL testing.

⁸ 29 CFR Part 1910

7. Identification of which evaluation steps can be completed prior to certification or testing by a Nationally Recognized Testing Laboratory and which must be completed after certification or testing.

Upon receipt of a supplier's request for evaluation and review of an isolation technology, the Utility will coordinate with the supplier to organize a "kick-off" meeting for one or more of the Joint Utilities, individually or collectively, to meet and discuss the Utility evaluation process, the necessary documentation, and other requirements. Depending on the current state of a supplier's product, the kick-off meeting will take one of two forms:

a. Product is Developed but Not Yet NRTL-Certified

If a supplier submits a product for Joint Utility evaluation that has not yet been tested and certified by a NRTL as meeting all applicable national standards, the kick-off meeting will be used to: (1) provide Utility-specific resource information to the supplier (e.g., utility meter socket specification document); (2) discuss which national standards may be applicable to the technology; and (3) provide details of the Utility evaluation process and necessary requirements to move to the evaluation phase.

Also, depending on the state of a product, the Utility may provide initial cursory feedback on a supplier's product if it believes it will assist a supplier's ability to meet the Utility's specification requirements in the future. However, the Joint Utilities are not positioned to assist third parties in the design and development of their products. The Joint Utilities' staff (funded via customer rates) that would be responsible for the review and evaluation typically will consist of electrical metering engineers and distribution planning engineers whose other day-to-day work responsibilities will necessarily limit the role of the Utility to the evaluation and testing criteria set forth herein.

b. Product Is NRTL-Certified and Meets All Applicable National Standards

If a supplier submits a product for Utility evaluation that has been tested and certified by a NRTL as meeting all applicable national standards, the kick-off meeting will be used to: (1) review list of all required documentation and ensure supplier has clear understanding of what documentation is required; (2) ascertain the product is NRTL-listed and the submitted product test data is adequate; and (3) review steps in the Utility evaluation process, including provision of product samples and subsequent Utility lab tests.

However, for the Utilities' evaluations and assessments to be safe and complete, the submitted technology must undergo product testing and final report by the NRTL prior to the Utility's testing of the product. If Utility testing of a product were performed prior to NRTL certification, it is likely that testing will have to be repeated if the design of the product were later modified due to the NRTL certification process. Since Utility customers will be funding the testing of third-party supplier products, it would be unreasonable and inefficient to lab test a product before it is NRTL certified and then potentially have to fund re-tests of the product if the design changes. Finally, there is also risk to the health and safety of Utility personnel performing the lab testing if the product is not adequately designed with appropriate safety layers reviewed and certified by a NRTL.

8. Discussion of circumstances when lab or field testing by the Joint Utilities will be required in addition to certification by a Nationally Recognized Testing Laboratory to applicable standards (e.g., UL 414 and UL 1741).

The Utility will perform additional testing that is independent of the UL testing performed by a NRTL. The Utility's testing will examine the effects of the electrical isolation technology on the Utility's Advanced Metering Infrastructure (AMI) system (e.g., metering accuracy), ability to withstand high-voltage surges, and if the product can safely perform as intended based on inverter specifications. The Joint Utilities do not expect to repeat any testing already completed as part of product's certification by a NRTL to applicable national standards, unless necessary as described in Section 9.

In addition, each of the Joint Utilities, in reviewing a product for its service territory, will accept the test results of another of the Joint Utilities for those tests that are agnostic to the unique characteristics of each Utility system and AMI. This coordination among the Joint Utilities to accept each other's test results applies only in specific applicable circumstances and, for example, would not apply to testing of interaction with each utility's AMI systems and for metering accuracy.

The Joint Utilities also recognize that the Decision was neither specific nor restrictive regarding the evaluation of only at the meter technologies but can also include Utility evaluation of in-front-of-meter (IFOM) isolation technologies. However, given that any IFOM solutions would be on a utility's distribution system, each of the Joint Utilities already has processes to procure necessary IFOM isolation devices to meet operational needs.

The Joint Utilities understand that the process outlined herein applies solely to isolation technologies at the meter. As part of the evaluation and assessment, the Joint Utilities will require lab and/or field testing to validate the safety, reliability, and functionality of the technology or device. The technology or device must meet OSHA standards to ensure worker safety and to identify specific hazardous conditions. Any required additional testing beyond NRTL certification will be for a clearly stated purpose by the utility and the utility will define criteria or thresholds for test passage

9. Justification by Joint Utilities for repeating any testing (e.g., high-voltage, environmental performance testing) already completed as part of certification to a national standard by a Nationally Recognized Testing Laboratory.

In some circumstances a Utility may need to replicate testing completed by the supplier or its contracted third-party. Based on the Joint Utilities' experience with nascent technologies that have not been deployed for mass-market commercial use, anomalies have been found during review of NRTL test data and/or Utility testing of products that previously have been tested by suppliers. Recognizing the role of the Utility in conducting the final review and testing before a product is deployed, it is important for the Utility to review test data and to validate a NRTL test if there are anomalies or other questions about a test result.

Submittal of NRTL test data to the utility or repetition, by the utility, of testing already completed by an NRTL will only be required when the utility clearly states why the NRTL certification or testing is inadequate and why the utility needs to examine NRTL test data or repeat NRTL testing.

The Utility will collaborate with the supplier to detect and address any such anomalies that affect the safety, reliability, inter-operability, and performance of the technology or device for utility-grade tariffed customer service and interconnection. Upon remediation, the Utility will conduct regression testing to validate intended performance and functionality. Depending on location of installation and technology, additional measures may be required before final approval, including training of Utility workforce, development of new Utility standards or updates to existing standards, and coordination changes to ensure that operation of the technology does not conflict with or introduce safety challenges outside of daily tasks incurred by the Utility.

The Joint Utilities' recent experience with review and evaluation of a nascent technology, where the supplier claimed that it was NRTL certified to the applicable UL Standard demonstrated why it is critical for the Utility to in certain instances assess and validate that it is indeed the case. The Joint Utilities identified that that the UL Standard under which the product was certified did not appear to cover certain safety and reliability components built into the product. The Joint Utilities engaged UL, as the SDO, which then confirmed that the novel product was not covered under that specific UL Standard or any other UL standard, and that the SDO would need to develop an annex to an existing UL standard to cover the product. One of the reasons provided by UL to the Joint Utilities is that no existing UL Standard considers how the various components within the new and innovative technology interacts with each other while ensuring it is safe and reliable operation. Though this situation may not occur frequently, the Joint Utilities may need to assess the validity of a product certified to a national standard by a NRTL.

10. Identification of an evaluation approach for examining the use of advanced metering infrastructure, and technologies that leverage it, to enable electrical isolation as a viable resilience strategy, as identified on page 4 of the July 3, 2020, R.19-09-009 scoping ruling.

Attachment A Supplier Technical Checklist contains the general evaluation approach for examining isolation technologies, including AMI. The Utility will make clear evaluation criteria used for the assessment of any AMI proposed for review by the supplier – e.g., physical inspections, power on/off, voltage variations, full load testing, light load testing, no load testing, disconnect/reconnect if applicable, firmware, and configuration updates if applicable, hardware/software interface (including cybersecurity), local, and remote functionalities.

11. Discussion of circumstances requiring utility-supplied technology.

Technologies installed within the Utility workspace must demonstrably mitigate any safety risk and not pose interoperability issues with Utility infrastructure, such as the meter. Further, the isolation device must not interfere with the Utilities' ability to retrieve meter data, secure customer data, perform maintenance on owned assets, and control the connection and disconnection of customer premises.

The Joint Utilities' respective evaluation criteria and plans will support functional testing of submitted technology that touches, connects to, or affects the Utility meter or meter functionality, both during initial installation and upon subsequent operation and maintenance. The evaluation process will dictate, on a case-by-case basis, whether the technology will be customer-supplied or utility-supplied.

The Joint Utilities' respective evaluation and assessment reports regarding different supplier technologies and devices will also include, as appropriate, any legal issues associated with the technologies and devices, including ownership and open access to the technologies and devices. The installation of customer-supplied and/or customer-owned equipment between the Utility meter and the customer panel raises a variety of concerns that will be resolved in collaboration with suppliers based on the specific supplier technologies. This collaboration on ownership and other contractual and operational issues (e.g., access to device, liability, etc.) can begin in parallel with the Utility's technical evaluation of a product. The collaboration on the ownership model and other contractual issues will be informed by the technical safety and reliability evaluation.

When an isolation device is installed between the Utility service point and the meter, there may be situations where Utility access to the device is necessary. For example, in case of device failure that impacts service to the customer, the Utility would need access to the diagnostic information to restore power safely and avoid unnecessary delayed response. Additionally, any insights that would provide information on the health of the installation, such as potential hot sockets or arcing, should be provided to the Utility to ensure safety and to prevent potential fire incidents.⁹

Customers will retain ownership of customer supplied equipment unless a utility clearly demonstrates a safety-based need for ownership to be transferred to the utility. Circumstances where Utility ownership of the isolation device is needed, and decisions on Utility, third-party, or customer ownership and/or control of, and access to, the isolation device will depend on:

- the results of the technical safety and reliability evaluation conducted under the process herein;
- impacts to customer service and experience;
- Physical location of technology being installed;
- commercial and manufacturing availability in compliance with the technical evaluation; and
- any formal guidance and approval required from the Commission, as appropriate.

Whether the device is customer-owned, controlled, and maintained or Utility-owned, controlled, and maintained, novel agreements and processes may be necessary to govern the following:

⁹ For example, PG&E's SmartMeter technology currently has capabilities to provide information on the health of the meter socket, such as temperatures above 130 degrees Fahrenheit for consecutive periods of time. This temperature information helps ensure safety and prevent potential fire incidents at the customer panel. Third-party electrical isolation technologies installed between a PG&E SmartMeter and the meter socket would no longer allow PG&E to monitor the meter socket health with the embedded SmartMeter technology.

- Utility and supplier roles/responsibilities during the installation process
- Utility and supplier roles/responsibility to respond to customer requests for service (including unexpected disconnection from the grid and after-hours calls)
- Utility and supplier ability/responsibility to inspect and maintain the installation/configuration (including configuration of panel connection to customer device)
- Utility/supplier ability/responsibility to remove the customer device (either for a short period for inspection or for an indefinite period due to device failure)
- Utility/supplier ability/responsibility to re-install customer device following removal
- Utility/supplier ability/responsibility to understand current status of the device
- Defined processes/procedures/limitations for Utility/vendor to activate the device and disconnect and reconnect customer from the grid.
- Processes/limitations on aggregations of customers simultaneously disconnecting or reconnecting to the grid
- Utility/vendor ability/responsibility to manually override the device in response to customer request.
- Utility ability to verify that customer generation equipment will revert to anti-islanding functionality in the event the isolation switch is inoperable or removed.
- Utility and supplier roles/responsibility when there are multiple suppliers with proprietary or non-proprietary at-the-meter electrical isolation technologies and how to respond to customer requests when issues with service arise.
- Defined processes/procedures for transferring responsibility for maintenance/removal of the device if the supplier that developed the at-the-meter electrical isolation technology goes bankrupt or out of business for other reasons.
- Additional consumer protections as needed to ensure safe, reliable service.

Each of the Joint Utilities will collaborate with suppliers to determine mutually acceptable processes, procedures, and agreements to address the above concerns and other issues that may be identified.

12. Process and proposed timeframe for completing detailed evaluation by Joint Utilities, inclusive of a determination and explanation regarding whether the proposed technology is approved for use and for reflecting that determination in the Joint Utilities' service rule

See response to section 3, above.

13. Process and frequency for reporting, to the Commission, summaries and outcomes of technology evaluations undertaken by Joint Utilities, including information from the perspective of the submitter of the technology and a summary of any irresolvable disputes between the evaluating utility and the submitter of the technology.

A Utility's evaluation and assessment reports will be provided upon request to the Commission and will include comments on the reports by the respective suppliers, based on advance

availability of the draft reports to the suppliers. Information and results may be considered proprietary and may, therefore, be submitted with a request for confidential treatment.

Both the utility and the supplier shall notify each other, the Commission, and the other two Utilities if any safety concerns are found with an electrical isolation device, that was approved under the evaluation process required by D.21-01-018 Ordering Paragraph 9, after it has been installed. This requirement shall be included in any novel agreement between the utility and supplier.

Attachment A Supplier Technical Checklist

The criteria, standards, and requirements outlined below are necessary for the Joint Utilities to begin the technical evaluation process for any new behind the meter isolation technology.

1. Certified test report by a Nationally Recognized Testing Laboratory documenting the tests completed and their results. A certified test report documenting the tests and their results. The test report will be signed by the supplier's chief engineer and include all charts, graphs, and data recorded during testing, including a full copy of the exponent report.
2. Proof of compliance with the most current certifications to applicable national standards, including detailed test results and meta data, in advance of evaluation by the Joint Utilities.¹ The standards identified in Table 1 below shall be applied, but not limited, to the microgrid ecosystem.
3. Compliance with the following tariffs relating to interconnection, cybersecurity, and customer data privacy:
 - a) Rule 21 – Generation Facility Interconnection (section Hh.1c)
 - b) Rule 25 – Release of Customer Data to Third Parties
 - c) Rule 27 – Privacy and Security Protections for Energy
 - d) Rule 27.1 – Access to Energy Usage and Usage-Related Data While Protecting of Personal Data
4. No product shall be installed on customer premise before all test and certification requirements are met and approved by Joint Utilities.
5. Detailed description and cutsheets of the new product or technology.
6. Electrical schematics, firmware/software schematics, detailed description of operating system (e.g., sync settings), failure mechanism, and communications systems.
7. Installation, maintenance documents, and training materials, plus details on the O&M cost projections.
8. A full functioning system to be installed in the Utilities' labs. Utility testing is necessary to validate the new technology, confirm application with internal equipment unique to each Utility, and develop internal standards to train workforce.² Any required additional testing beyond NRTL certification will be for a clearly stated purpose by the utility and the utility will define criteria or thresholds for test passage.

¹ It is wholly the responsibility of the supplier to demonstrate readiness prior to Joint Utilities conducting evaluations and assessments, including applicable cyber security standards and penetration testing results. Additional standards and/or safety requirements certification may be identified, depending on the technology type and integration with Utility system.

² The Lab Testing and the Functional and Integration Testing can be performed in parallel and do not need to occur sequentially.

- a) *Lab Testing*: 6-8 samples, 3+ months. Collaborations amongst the Joint Utilities on certain tests can be allowed.
- b) *Functional and Integration Testing*: 3+ month duration, where each Utility will conduct its own independent end to end testing.
- c) *Pilot Testing*: Field test, with a joint effort from the supplier, where the device is installed at a customer’s premise. The pilot identifies areas for possible training for Utility field personnel and validate field functionality in various climate zones. The duration of the pilot may vary unless agreed upon between the supplier and Utility.

Table 1 – Devices and Standards

Device	Applicable Suggested Behind the Meter Standard ³
Transfer Switch	<ul style="list-style-type: none"> ▪ UL 1008: Transfer Switch Equipment ▪ NFPA 110: Emergency and Standby Power Systems ▪ IEEE 446: IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications ▪ NEMA ICS10: Automatic Transfer Switches
Metered-Mounted Transfer Switch	<ul style="list-style-type: none"> ▪ UL 1008M: Meter-Mounted Transfer Switch Equipment, which includes parameters for UL 414 Safety Meter Sockets Standard ▪ UL 508: Industrial Control Equipment for Electric Motors ▪ UL 1449: Surge Protective Devices ▪ ANSI C12.1: Code for Electricity Metering – Service Switch ▪ OSHA 1910.147: standard for service and maintenance of equipment that can energize and harm employees. ▪ UL 489: Circuit Breakers
Electric Meter	<ul style="list-style-type: none"> ▪ UL 2735: Electric Utility Meter Safety Standard and Conformity Assessment ▪ ANSI C12.1: Code for Electricity Metering
Meter Socket	<ul style="list-style-type: none"> ▪ UL 414: Safety Meter Sockets Standard ▪ ANSI C12.1: Code for Electricity Metering
Smart Inverter	<ul style="list-style-type: none"> ▪ UL 1741: Test Procedure for Inverters, Converters, Controllers, and DER Equipment ▪ IEEE 1547: Standard for Interconnecting Distributed Resources with Electric Power Systems ▪ IEEE 2030.5: Standard for Communications Protocol

³ General standards currently required for equipment that comprises a microgrid. The standards that apply to any technology or equipment depend on the unique characteristics and function of that equipment. Consultation with SDOs may be necessary to confirm which national standards may be applicable to the isolation technologies, depending on equipment design. Consultation with an SDO, by a supplier of an electrical isolation technology, is a recommendation only.

Operational Safety

- California Code of Regulations, title 8, section 2940.13 (Deenergizing Lines and Equipment for Employee Protection)
- California Code of Regulations, title 8, section 2940.14 (Hazardous Energy Control Procedures).

August 22, 2022

ATTACHMENT A

REDLINE VERSION

**SAN DIEGO GAS & ELECTRIC COMPANY, SOUTHERN CALIFORNIA EDISON
COMPANY AND PACIFIC GAS AND ELECTRIC COMPANY (JOINT UTILITIES)
ELECTRIC EVALUATION PROCESS AND CRITERIA TO ASSESS MICROGRID
DIFFERENT ISOLATION TECHNOLOGIES**

EVALUATION CRITERIA AND PROCESS

A microgrid with a behind the meter (BTM) source allows customers to electrically island and isolate themselves from the Utility¹ being the source. When islanded, BTM generation resources continue to operate and provide power to the premise, which creates a high potential for electrical current to back-feed onto the grid absent an isolation device, or transfer switch.

The potential to back-feed and energize the distribution line cannot be understated. While the Joint Utilities support technologies that allow the customer to self-supply power during a Public Safety Power Shutoff (PSPS) event, if not properly isolated from the grid or a failure occurs by the isolating device, the distribution line could become energized. Such back-feed introduces the same fire potential risk the Joint Utilities are trying to mitigate with PSPS. In addition, the safety of our employees, contractors and the public will depend on the ability for the isolation device to function properly and prevent back-feed of a de-energized distribution line. Visible electrical isolation devices are the Utilities' best way to protect against back-feed to keep our workers and the public safe, especially during drastic conditions when an active PSPS is occurring.

The Joint Utilities support new technologies to enable microgrids that will ensure system, worker, and public safety, in accordance with PU Code §8371(d). However, equipment connected behind the meter and those that physically touch the Joint Utilities' meters on customer premises must be certified to the most current industry standards and codes. Standards development organizations (SDOs)² publish industry standards for a broad range of equipment. The United States Occupational Safety and Health Administration (OSHA) further enforces additional standards that ensure occupational safety for workers.³ In accordance with federal regulations, OSHA maintains a list of Nationally Recognized Testing Laboratories (NRTLs) that test and certify electrical equipment to all applicable national standards.

The Supplier Technical Checklist outlined in Attachment A provides a comprehensive list of the technical requirements that any supplier must provide to the Joint Utilities in order to complete the evaluation process for new isolation technology. In addition to certifications, all device installations must meet National and California Electrical Code requirements, including permitting through the local authority/government with jurisdiction.

¹ *San Diego Gas & Electric Company (SDG&E), Southern California Edison Company (SCE) and Pacific Gas and Electric Company (PG&E) are individually referred to as a "Utility" and collectively as the "Joint Utilities."*

² Underwriters Laboratories (UL), Institute of Electrical and Electronics Engineers (IEEE), American National Standards Institute (ANSI), National Electrical Manufacturers Association (NEMA), National Fire Protection Association (NFPA), among others.

³ 29 CFR Part 1910.

Joint Utilities will include utility frontline workers or their representatives in the evaluation process.

1. Process for submittal of isolation technology by a third-party to Joint Utilities.

Any supplier that desires to submit isolation technology for evaluation and review by the Joint Utilities must send an email⁴ to the Utilities with the subject line: “Request for Evaluation of Isolation Technology.” A supplier submitting a product for Utility evaluation must be well advanced in the design and development and the product must have a high probability of commercialization and only require Utilities’ input for evaluation (and not design). In that email, the supplier should provide, among other information:

- full contact information for the supplier, including email, phone number, and physical mailing address;
- state clearly if this technology is being tested with another ~~one of the three California investor utilities that are the subject of this advice letter~~ *Utility* to ensure appropriate coordination of resources;
- a detailed narrative description of the isolation technology or device;
- proof that such technology or device has received NRTL certification to the most current industry standards adopted by the applicable SDOs. *Further, it is recommended the supplier obtain* ~~and~~ communication from the national standard organization why that standard applies to this technology;⁵
- independent lab testing results justifying the certification and already completed for the electrical isolation technology or device;
- detailed diagrams, manuals, and pictures of the technology or device that can be shared with the Joint Utilities – in a public, non-confidential manner – to allow for better understanding of the product and capabilities;
- proposed relationship with the Utility and customer, and impacts on customer service and experience;⁶ and
- any other information that the supplier believes may be helpful to Joint Utilities in evaluating the technical, safety and operational aspects of the technology or device for use or installation by the respective customers of the Joint Utilities or for use or installation on a utility-scale level.

⁴ Upon approval of ~~this advice letter~~ *the advice letter ordered in Resolution E-5194, Ordering Paragraph 2*, the Joint Utilities will notice the service list with the advice letter and provide a dedicated email address for each utility for suppliers to submit requests for technology evaluation.

⁵ The supplier should consult with SDOs regarding what standards and test procedures are applicable to the specific technology or device. *Consultation with an SDO, by a supplier of an electrical isolation technology, is a recommendation only.*

⁶ Utility troubleshooters provide 24/7 customer service. Troubleshooters will be unable to commence field work until customer-owned isolation technology installed at the meter socket is removed.

If a supplier provides information on testing results and/or pilots in other utility territories, including those that are out-of-state, it will be used to help inform the Joint Utilities' understanding of the product, but it will not be a substitute for the Joint Utilities' collective or individual testing requirements (see Section 8). In addition to the design of customer electric panels varying between different portions of the country, the Joint Utilities each have customized systems for functional and integration testing designed to meet requirements specific to each Utility. The Commission also has its own General Orders, and the Joint Utilities need to ensure a supplier's product complies with California standards.

To the extent any test data provided to the utility is considered to be confidential by the submitting party, it shall be clearly marked "Confidential" on each applicable page with the specific material considered confidential by the submitting party on each such page highlighted in gray. The utility will treat any such material as confidential, meaning that it will for a period of three years from receipt, keep confidential and take reasonable precautions to protect against the disclosure of the material, except (1) as otherwise agreed by the utility and the submitting party; (2) if the utility is required by law or regulatory authority or otherwise becomes legally compelled (by oral questions, interrogatories, discovery or data requests, subpoena, or similar legal process) to disclose it; or (3) the utility may provide the material to the California Public Utilities Commission (CPUC) pursuant to its rules and regulations governing confidentiality or to any other regulatory agency or administrative agency, under similar protections, if possible, regardless whether the material is formally requested. The ultimate determination of whether documents submitted to the CPUC should remain sealed and non-public is made by the CPUC pursuant to its regulations. The utility will not be liable for any disclosure of any material submitted by a party to the utility if that disclosure is ordered by the CPUC.

2. Required timeframe for Joint Utilities to respond to the suppliers with a specific evaluation plan for the submitted technology.

Within 30 business-days of receiving the required information, the Utility to which the request was submitted will contact the supplier and request any follow-up information needed, start coordinating schedule technical meetings, ask for a demonstration of the technology or device, or make other relevant requests necessary for that Utility to conduct their evaluations of the technology or device. In addition, the Utility will provide the supplier with a draft "test and evaluation" agreement that will include terms and conditions for conducting the evaluation and assessment, modeled on the Commission's requirements for standard technology demonstration projects funded by utility customers under its Electric Program Investment Charge and Smart Grid Pilots decisions.⁷

The proposed 30-business day timeframe for the Utility to contact the supplier and do follow-up is contingent on the number of suppliers requesting evaluation by the Utility at that point in

⁷ See D.20-08-042, at 2-7, summarizing prior CPUC decisions adopting criteria for technology demonstration projects; D.13-03-032, at 6-8, summarizing CPUC criteria for approval of Smart Grid-related pilot technologies under Smart Grid decisions.

time and contingent on the status of any emergency events. If the Utility has multiple suppliers requesting evaluation of their products simultaneously, the Utility staff will not be able to meet the 30-business day timeframe given review of multiple products while conducting their day-to-day work responsibilities. There will need to be some flexibility regarding the timeframe based on the number of suppliers in the queue for evaluation or other operational priorities (e.g., activation of Emergency Operations Centers, mutual assistance and etc.) occurring requiring increased resources to support.

3. Required timeframe for completion of an initial evaluation by Joint Utilities.

Each of the Joint Utilities will notify the supplier via email when it has determined that it has received sufficient information to properly evaluate the technology or device. Unless otherwise noted in the email, each of the Joint Utilities will complete its evaluation and provide its written report on the evaluation within 90 days of the email noting receipt of sufficient information. Each Utility will also keep the supplier reasonably informed about the progress of the evaluation, including any issues that are noted or delays in reviewing submittal.

Each Utility will undertake parallel actions whenever feasible to complete evaluation of a supplier's product. Parallel actions may include, but not be limited to, drafting and review of the testing plans while a supplier completes the NRTL certification, or if the product is already NRTL certified to all applicable UL standards, the Utility can conduct the lab testing and functional and integration testing as described in Attachment A in parallel. While parallel action may be possible, all proposed technologies will continue to be required to meet all of the standards and requirements set forth in this ~~Advice Letter~~ *evaluation criteria and process document and Attachment A* for certification, whether testing occurs in parallel or in series, to ensure the safety of electric service to customers, employees and the public.

The proposed 90-day timeframe for completing the Utility's evaluation includes consideration of the need to schedule time at Utility testing facilities or an external testing facility at least 30 days in advance and other Commission orders requiring testing of technologies at the Utility laboratories.

An alternative path that a Utility can discuss with suppliers, if requested, would be for the supplier to request and reimburse an independent OSHA-certified lab to perform the utility-required lab testing. However, the Functional and Integration Testing (as described in Attachment A) will need to be performed by each of the Joint Utilities at its respective labs since each has customized systems that will require specific functional testing requirement to meet its end-to-end testing, including different metering technologies.

4. Process for engaging with and providing Joint Utilities feedback to the submitter of the technology.

Consistent with other iterative and collaborative technology evaluations, the Utility and the supplier will reasonably cooperate with each other to complete the evaluation in a reasonable timeframe as described ~~in this supplemental advice letter~~ *herein*. The Utility and the supplier will establish a reasonable schedule of calls, meetings, or other means of providing feedback and progress during the evaluation process. Recognizing that each product will be unique and

some will be more complex than others, the Utility will need to tailor engagement with a supplier accordingly to ensure that the technical safety and reliability evaluation can be completed.

As described in Section 7 below, the Joint Utilities' technical evaluation teams are not positioned to assist third parties in the design and development of their products. A supplier submitting a product for Utility evaluation must be well advanced in the design and development of a product, and the product must have a high probability of commercialization.

5. Expectations for engagement by and response to Joint Utilities feedback from submitter of the technology.

During the evaluation process, the supplier may receive requests for additional information and responses to interim test and assessment results from a Utility. The supplier should respond as soon as reasonably practicable given the circumstances, keeping in mind that the evaluation process may be delayed if the supplier is not able to promptly respond.

6. Process for identifying which, if any, standards or safety requirements are applicable and must be certified or tested by a Nationally Recognized Testing Laboratory (e.g., Intertek, UL).

Suppliers shall seek certification at a NRTL to the most current industry standards adopted by the applicable SDO. *If needed*, the supplier is responsible for asking the SDO, what specific standards would apply that align with their technology or if a new standard needs to be developed. This process should be completed in advance of submittal to one or more of the Joint Utilities, given that the NRTL certification process may yield additional standards or safety requirements certification based on the technology type and its unique characteristics. It is wholly the responsibility of the supplier to demonstrate readiness prior to one or more of the Joint Utilities conducting the evaluations and assessments.

Consultation with a SDO, by a supplier of an electrical isolation technology, is recommended but not required.

When electrical isolation devices or technologies have features or components that may be out of the scope of existing national standards, the Joint Utilities have the ability to question a NRTL's determination of applicability of standards and to acquire the opinion of an SDO or a different NRTL on the applicability of standards.

The submitted technology must comply with the most current applicable standards, such as and not limited to those identified in Table 1 of Attachment A. In addition, the submitted technology must meet OSHA standards to ensure the worker's safety and to identify specific hazardous conditions at the jobsite.⁸

Submittal of NRTL test data to the utility or repetition, by the utility, of testing already completed by an NRTL will only be required when the utility clearly states why the NRTL certification or

⁸ 29 CFR Part 1910

testing is inadequate and why the utility needs to examine NRTL test data or repeat NRTL testing.

7. Identification of which evaluation steps can be completed prior to certification or testing by a Nationally Recognized Testing Laboratory and which must be completed after certification or testing.

Upon receipt of a supplier's request for evaluation and review of an isolation technology, the Utility will coordinate with the supplier to organize a "kick-off" meeting for one or more of the Joint Utilities, individually or collectively, to meet and discuss the Utility evaluation process, the necessary documentation, and other requirements. Depending on the current state of a supplier's product, the kick-off meeting will take one of two forms:

a. Product is Developed but Not Yet NRTL-Certified

If a supplier submits a product for Joint Utility evaluation that has not yet been tested and certified by a NRTL as meeting all applicable national standards, the kick-off meeting will be used to: (1) provide Utility-specific resource information to the supplier (e.g., utility meter socket specification document); (2) discuss which national standards may be applicable to the technology; and (3) provide details of the Utility evaluation process and necessary requirements to move to the evaluation phase.

Also, depending on the state of a product, the Utility may provide initial cursory feedback on a supplier's product if it believes it will assist a supplier's ability to meet the Utility's specification requirements in the future. However, the Joint Utilities are not positioned to assist third parties in the design and development of their products. The Joint Utilities' staff (funded via customer rates) that would be responsible for the review and evaluation typically will consist of electrical metering engineers and distribution planning engineers whose other day-to-day work responsibilities will necessarily limit the role of the Utility to the evaluation and testing criteria set forth [herein in this Advice Letter](#).

b. Product Is NRTL-Certified and Meets All Applicable National Standards

If a supplier submits a product for Utility evaluation that has been tested and certified by a NRTL as meeting all applicable national standards, the kick-off meeting will be used to: (1) review list of all required documentation and ensure supplier has clear understanding of what documentation is required; (2) ascertain the product is NRTL-listed and the submitted product test data is adequate; and (3) review steps in the Utility evaluation process, including provision of product samples and subsequent Utility lab tests.

However, for the Utilities' evaluations and assessments to be safe and complete, the submitted technology must undergo product testing and final report by the NRTL prior to the Utility's testing of the product. If Utility testing of a product were performed prior to NRTL certification, it is likely that testing will have to be repeated if the design of the product were later modified due to the NRTL certification process. Since Utility customers will be funding the testing of third-party supplier products, it would be unreasonable and inefficient to lab test a product before it is NRTL certified and then potentially have to fund re-tests of the product if the design changes.

Finally, there is also risk to the health and safety of Utility personnel performing the lab testing if the product is not adequately designed with appropriate safety layers reviewed and certified by a NRTL.

8. Discussion of circumstances when lab or field testing by the Joint Utilities will be required in addition to certification by a Nationally Recognized Testing Laboratory to applicable standards (e.g., UL 414 and UL 1741).

The Utility will perform additional testing that is independent of the UL testing performed by a NRTL. The Utility's testing will examine the effects of the electrical isolation technology on the Utility's Advanced Metering Infrastructure (AMI) system (e.g., metering accuracy), ability to withstand high-voltage surges, and if the product can safely perform as intended based on inverter specifications. The Joint Utilities do not expect to repeat any testing already completed as part of product's certification by a NRTL to applicable national standards, unless necessary as described in Section 9.

In addition, each of the Joint Utilities, in reviewing a product for its service territory, will accept the test results of another of the Joint Utilities for those tests that are agnostic to the unique characteristics of each Utility system and AMI. This coordination among the Joint Utilities to accept each other's test results applies only in specific applicable circumstances and, for example, would not apply to testing of interaction with each utility's AMI systems and for metering accuracy.

The Joint Utilities also recognize that the Decision was neither specific nor restrictive regarding the evaluation of only at the meter technologies but can also include Utility evaluation of in-front-of-meter (IFOM) isolation technologies. However, given that any IFOM solutions would be on a utility's distribution system, each of the Joint Utilities already has processes to procure necessary IFOM isolation devices to meet operational needs.

The Joint Utilities understand that the process outlined herein applies solely to isolation technologies at the meter. As part of the evaluation and assessment, the Joint Utilities will require lab and/or field testing to validate the safety, reliability, and functionality of the technology or device. The technology or device must meet OSHA standards to ensure worker safety and to identify specific hazardous conditions. Any required additional testing beyond NRTL certification will be for a clearly stated purpose by the utility and the utility will define criteria or thresholds for test passage.

9. Justification by Joint Utilities for repeating any testing (e.g., high-voltage, environmental performance testing) already completed as part of certification to a national standard by a Nationally Recognized Testing Laboratory.

In some circumstances a Utility may need to replicate testing completed by the supplier or its contracted third-party. Based on the Joint Utilities' experience with nascent technologies that have not been deployed for mass-market commercial use, anomalies have been found during review of NRTL test data and/or Utility testing of products that previously have been tested by suppliers. Recognizing the role of the Utility in conducting the final review and testing before a

product is deployed, it is important for the Utility to review test data and to validate a NRTL test if there are anomalies or other questions about a test result.

Submittal of NRTL test data to the utility or repetition, by the utility, of testing already completed by an NRTL will only be required when the utility clearly states why the NRTL certification or testing is inadequate and why the utility needs to examine NRTL test data or repeat NRTL testing.

The Utility will collaborate with the supplier to detect and address any such anomalies that affect the safety, reliability, inter-operability, and performance of the technology or device for utility-grade tariffed customer service and interconnection. Upon remediation, the Utility will conduct regression testing to validate intended performance and functionality. Depending on location of installation and technology, additional measures may be required before final approval, including training of Utility workforce, development of new Utility standards or updates to existing standards, and coordination changes to ensure that operation of the technology does not conflict with or introduce safety challenges outside of daily tasks incurred by the Utility.

The Joint Utilities' recent experience with review and evaluation of a nascent technology, where the supplier claimed that it was NRTL certified to the applicable UL Standard demonstrated why it is critical for the Utility to in certain instances assess and validate that it is indeed the case. The Joint Utilities identified that that the UL Standard under which the product was certified did not appear to cover certain safety and reliability components built into the product. The Joint Utilities engaged UL, as the SDO, which then confirmed that the novel product was not covered under that specific UL Standard or any other UL standard, and that the SDO would need to develop an annex to an existing UL standard to cover the product. One of the reasons provided by UL to the Joint Utilities is that no existing UL Standard considers how the various components within the new and innovative technology interacts with each other while ensuring it is safe and reliable operation. Though this situation may not occur frequently, the Joint Utilities may need to assess the validity of a product certified to a national standard by a NRTL.

10. Identification of an evaluation approach for examining the use of advanced metering infrastructure, and technologies that leverage it, to enable electrical isolation as a viable resilience strategy, as identified on page 4 of the July 3, 2020, R.19-09-009 scoping ruling.

Attachment A Supplier Technical Checklist contains the general evaluation approach for examining isolation technologies, including AMI. The Utility will make clear evaluation criteria used for the assessment of any AMI proposed for review by the supplier – e.g., physical inspections, power on/off, voltage variations, full load testing, light load testing, no load testing, disconnect/reconnect if applicable, firmware, and configuration updates if applicable, hardware/software interface (including cybersecurity), local, and remote functionalities.

11. Discussion of circumstances requiring utility-supplied technology.

Technologies installed within the Utility workspace must demonstrably mitigate any safety risk and not pose interoperability issues with Utility infrastructure, such as the meter. Further, the isolation device must not interfere with the Utilities' ability to retrieve meter data, secure

customer data, perform maintenance on owned assets, and control the connection and disconnection of customer premises.

The Joint Utilities' respective evaluation criteria and plans will support functional testing of submitted technology that touches, connects to, or affects the Utility meter or meter functionality, both during initial installation and upon subsequent operation and maintenance. The evaluation process will dictate, on a case-by-case basis, whether the technology will be customer-supplied or utility-supplied.

The Joint Utilities' respective evaluation and assessment reports regarding different supplier technologies and devices will also include, as appropriate, any legal issues associated with the technologies and devices, including ownership and open access to the technologies and devices. The installation of customer-supplied and/or customer-owned equipment between the Utility meter and the customer panel raises a variety of concerns that will be resolved in collaboration with suppliers based on the specific supplier technologies. This collaboration on ownership and other contractual and operational issues (e.g., access to device, liability, etc.) can begin in parallel with the Utility's technical evaluation of a product. The collaboration on the ownership model and other contractual issues will be informed by the technical safety and reliability evaluation.

When an isolation device is installed between the Utility service point and the meter, there may be situations where Utility access to the device is necessary. For example, in case of device failure that impacts service to the customer, the Utility would need access to the diagnostic information to restore power safely and avoid unnecessary delayed response. Additionally, any insights that would provide information on the health of the installation, such as potential hot sockets or arcing, should be provided to the Utility to ensure safety and to prevent potential fire incidents.⁹

Customers will retain ownership of customer supplied equipment unless a utility clearly demonstrates a safety-based need for ownership to be transferred to the utility. Circumstances where Utility ownership of the isolation device is needed, and Decisions on Utility, third-party, or customer ownership and/or control of, and access to, the isolation device will depend on:

- the results of the technical safety and reliability evaluation conducted under ~~this~~ the process ~~in this advice letter~~ *herein*;
- impacts to customer service and experience;
- Physical location of technology being installed;
- commercial and manufacturing availability in compliance with the technical evaluation; and
- any formal guidance and approval required from the Commission, as appropriate.

⁹ For example, PG&E's SmartMeter technology currently has capabilities to provide information on the health of the meter socket, such as temperatures above 130 degrees Fahrenheit for consecutive periods of time. This temperature information helps ensure safety and prevent potential fire incidents at the customer panel. Third-party electrical isolation technologies installed between a PG&E SmartMeter and the meter socket would no longer allow PG&E to monitor the meter socket health with the embedded SmartMeter technology.

Whether the device is customer-owned, controlled, and maintained or Utility-owned, controlled, and maintained, novel agreements and processes may be necessary to govern the following:

- Utility and supplier roles/responsibilities during the installation process
- Utility and supplier roles/responsibility to respond to customer requests for service (including unexpected disconnection from the grid and after-hours calls)
- Utility and supplier ability/responsibility to inspect and maintain the installation/configuration (including configuration of panel connection to customer device)
- Utility/supplier ability/responsibility to remove the customer device (either for a short period for inspection or for an indefinite period due to device failure)
- Utility/supplier ability/responsibility to re-install customer device following removal
- Utility/supplier ability/responsibility to understand current status of the device
- Defined processes/procedures/limitations for Utility/vendor to activate the device and disconnect and reconnect customer from the grid.
- Processes/limitations on aggregations of customers simultaneously disconnecting or reconnecting to the grid
- Utility/vendor ability/responsibility to manually override the device in response to customer request.
- Utility ability to verify that customer generation equipment will revert to anti-islanding functionality in the event the isolation switch is inoperable or removed.
- Utility and supplier roles/responsibility when there are multiple suppliers with proprietary or non-proprietary at-the-meter electrical isolation technologies and how to respond to customer requests when issues with service arise.
- Defined processes/procedures for transferring responsibility for maintenance/removal of the device if the supplier that developed the at-the-meter electrical isolation technology goes bankrupt or out of business for other reasons.
- Additional consumer protections as needed to ensure safe, reliable service.

Each of the Joint Utilities will collaborate with suppliers to determine mutually acceptable processes, procedures, and agreements to address the above concerns and other issues that may be identified.

12. Process and proposed timeframe for completing detailed evaluation by Joint Utilities, inclusive of a determination and explanation regarding whether the proposed technology is approved for use and for reflecting that determination in the Joint Utilities' service rule

See response to section 3, above.

13. Process and frequency for reporting, to the Commission, summaries and outcomes of technology evaluations undertaken by Joint Utilities, including information from the perspective of the submitter of the technology and a summary of any irresolvable disputes between the evaluating utility and the submitter of the technology.

A Utility's evaluation and assessment reports will be provided upon request to the Commission and will include comments on the reports by the respective suppliers, based on advance availability of the draft reports to the suppliers. Information and results may be considered proprietary and may, therefore, be submitted with a request for confidential treatment.

Both the utility and the supplier shall notify each other, the Commission, and the other two Utilities if any safety concerns are found with an electrical isolation device, that was approved under the evaluation process required by D.21-01-018 Ordering Paragraph 9, after it has been installed. This requirement shall be included in any novel agreement between the utility and supplier.

Attachment A Supplier Technical Checklist

The criteria, standards, and requirements outlined below are necessary for the Joint Utilities to begin the technical evaluation process for any new behind the meter isolation technology.

1. Certified test report by a Nationally Recognized Testing Laboratory documenting the tests completed and their results. A certified test report documenting the tests and their results. The test report will be signed by the supplier's chief engineer and include all charts, graphs, and data recorded during testing, including a full copy of the exponent report.
2. Proof of compliance with the most current certifications to applicable national standards, including detailed test results and meta data, in advance of evaluation by the Joint Utilities.¹ The standards identified in Table 1 below shall be applied, but not limited, to the microgrid ecosystem.
3. Compliance with the following tariffs relating to interconnection, cybersecurity, and customer data privacy:
 - a) Rule 21 – Generation Facility Interconnection (section Hh.1c)
 - b) Rule 25 – Release of Customer Data to Third Parties
 - c) Rule 27 – Privacy and Security Protections for Energy
 - d) Rule 27.1 – Access to Energy Usage and Usage-Related Data While Protecting of Personal Data
4. No product shall be installed on customer premise before all test and certification requirements are met and approved by Joint Utilities.
5. Detailed description and cutsheets of the new product or technology.
6. Electrical schematics, firmware/software schematics, detailed description of operating system (e.g., sync settings), failure mechanism, and communications systems.
7. Installation, maintenance documents, and training materials, plus details on the O&M cost projections.
8. A full functioning system to be installed in the Utilities' labs. Utility testing is necessary to validate the new technology, confirm application with internal equipment unique to each Utility, and develop internal standards to train workforce.² *Any required additional testing beyond NRTL certification will be for a clearly stated purpose by the utility and the utility will define criteria or thresholds for test passage.*

¹ It is wholly the responsibility of the supplier to demonstrate readiness prior to Joint Utilities conducting evaluations and assessments, including applicable cyber security standards and penetration testing results. Additional standards and/or safety requirements certification may be identified, depending on the technology type and integration with Utility system.

² *The Lab Testing and the Functional and Integration Testing can be performed in parallel and do not need to occur sequentially.*

- a) *Lab Testing*: 6-8 samples, 3+ months. Collaborations amongst the Joint Utilities on certain tests can be allowed.
- b) *Functional and Integration Testing*: 3+ month duration, where each Utility will conduct its own independent end to end testing.
- c) *Pilot Testing*: Field test, with a joint effort from the supplier, where the device is installed at a customer’s premise. The pilot identifies areas for possible training for Utility field personnel and validate field functionality in various climate zones. The duration of the pilot may vary unless agreed upon between the supplier and Utility.

Table 1 – Devices and Standards

Device	Applicable Suggested Behind the Meter Standard ³
Transfer Switch	<ul style="list-style-type: none"> ▪ UL 1008: Transfer Switch Equipment ▪ NFPA 110: Emergency and Standby Power Systems ▪ IEEE 446: IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications ▪ NEMA ICS10: Automatic Transfer Switches
Metered-Mounted Transfer Switch	<ul style="list-style-type: none"> ▪ UL 1008M: Meter-Mounted Transfer Switch Equipment, which includes parameters for UL 414 Safety Meter Sockets Standard ▪ UL 508: Industrial Control Equipment for Electric Motors ▪ UL 1449: Surge Protective Devices ▪ ANSI C12.1: Code for Electricity Metering – Service Switch ▪ OSHA 1910.147: standard for service and maintenance of equipment that can energize and harm employees. ▪ UL 489: Circuit Breakers
Electric Meter	<ul style="list-style-type: none"> ▪ UL 2735: Electric Utility Meter Safety Standard and Conformity Assessment ▪ ANSI C12.1: Code for Electricity Metering
Meter Socket	<ul style="list-style-type: none"> ▪ UL 414: Safety Meter Sockets Standard UL-414: Updated in 2022 with revision to Supplement SB—Meter Socket Adapters for Use with Distributed Generation Equipment ▪ ANSI C12.1: Code for Electricity Metering
Smart Inverter	<ul style="list-style-type: none"> ▪ UL 1741: Test Procedure for Inverters, Converters, Controllers, and DER Equipment ▪ IEEE 1547: Standard for Interconnecting Distributed Resources with Electric Power Systems ▪ IEEE 2030.5: Standard for Communications Protocol

³ General standards currently required for equipment that comprises a microgrid. The standards that apply to any technology or equipment depend on the unique characteristics and function of that equipment. Consultation with SDOs may be necessary to confirm which national standards may be applicable to the isolation technologies, depending on equipment design. Consultation with an SDO, by a supplier of an electrical isolation technology, is a recommendation only.

	<ul style="list-style-type: none">▪ IEEE 2030.5: Standard for Communications Protocol
<i>Operational Safety</i>	<ul style="list-style-type: none">▪ <i>California Code of Regulations, title 8, section 2940.13 (Deenergizing Lines and Equipment for Employee Protection)</i>▪ <i>California Code of Regulations, title 8, section 2940.14 (Hazardous Energy Control Procedures).</i>

**PG&E Gas and Electric
Advice Submittal List
General Order 96-B, Section IV**

AT&T
Albion Power Company

Alta Power Group, LLC
Anderson & Poole

Atlas ReFuel
BART

Barkovich & Yap, Inc.
Braun Blasing Smith Wynne, P.C.
California Cotton Ginners & Growers Assn
California Energy Commission

California Hub for Energy Efficiency
Financing

California Alternative Energy and
Advanced Transportation Financing
Authority
California Public Utilities Commission
Calpine

Cameron-Daniel, P.C.
Casner, Steve
Center for Biological Diversity

Chevron Pipeline and Power
City of Palo Alto

City of San Jose
Clean Power Research
Coast Economic Consulting
Commercial Energy
Crossborder Energy
Crown Road Energy, LLC
Davis Wright Tremaine LLP
Day Carter Murphy

Dept of General Services
Don Pickett & Associates, Inc.
Douglass & Liddell

East Bay Community Energy Ellison
Schneider & Harris LLP
Engineers and Scientists of California

GenOn Energy, Inc.
Goodin, MacBride, Squeri, Schlotz &
Ritchie
Green Power Institute
Hanna & Morton
ICF
International Power Technology

Intertie

Intestate Gas Services, Inc.
Kelly Group
Ken Bohn Consulting
Keyes & Fox LLP
Leviton Manufacturing Co., Inc.

Los Angeles County Integrated
Waste Management Task Force
MRW & Associates
Manatt Phelps Phillips
Marin Energy Authority
McClintock IP
McKenzie & Associates

Modesto Irrigation District
NLine Energy, Inc.
NRG Solar

OnGrid Solar
Pacific Gas and Electric Company
Peninsula Clean Energy

Pioneer Community Energy

Public Advocates Office

Redwood Coast Energy Authority
Regulatory & Cogeneration Service, Inc.

Resource Innovations

SCD Energy Solutions
San Diego Gas & Electric Company

SPURR

San Francisco Water Power and Sewer
Sempra Utilities

Sierra Telephone Company, Inc.
Southern California Edison Company
Southern California Gas Company
Spark Energy
Sun Light & Power
Sunshine Design
Stoel Rives LLP

Tecogen, Inc.
TerraVerde Renewable Partners
Tiger Natural Gas, Inc.

TransCanada
Utility Cost Management
Utility Power Solutions
Water and Energy Consulting Wellhead
Electric Company
Western Manufactured Housing
Communities Association (WMA)
Yep Energy