



Pacific Gas and
Electric Company®

Los Angeles  Department of Water and Power



March 29, 2018

Mr. Dave Mehl
Manager, Project Assessment
Industrial Strategies Division
California Air Resources Board
1001 I Street
Sacramento, California 95814

RE: Additional Comments - November 28, 2017 Strawman Version of Potential SF6 Regulation Changes

Dear Mr. Mehl:

Pacific Gas & Electric Company, Sacramento Municipal Utility District, San Diego Gas & Electric Company, Southern California Edison Company, Los Angeles Department of Water and Power, Turlock Irrigation District, the Northern California Power Agency¹ and Southern California Public Power Authority² (“Utilities Group”) appreciate the opportunity to provide additional comments to the November 28, 2017 ‘Strawman Version’ of potential SF6 Regulation changes.

I. General Comments

We support amendments that will help reduce high global warming potential (GWP) gas emissions and still ensure that critical uses of sulfur hexafluoride (SF6) are preserved, particularly to warrant the continued safe and reliable operation of the statewide electricity grid. Based on recent meetings with several SF6-alternative equipment manufacturers, we offer further comments to the CARB staff strawman proposal for your consideration that address the following sections:

- Purpose, Scope, and Applicability (§ 95350)
- Definitions (§ 95351)
- Sulfur Hexafluoride Phase Out (§ 95352.1)
- Nameplate Capacity Adjustments (§ 95354.1)
- Annual Reporting Requirements, Annual Emission Rate (§ 95356(e))

¹ The Northern California Power Agency (NCPA) is a nonprofit California joint powers agency established in 1968 to construct and operate renewable and low-emitting generating facilities and assist in meeting the wholesale energy needs of its 16 members: the Cities of Alameda, Biggs, Gridley, Healdsburg, Lodi, Lompoc, Palo Alto, Redding, Roseville, Santa Clara, Shasta Lake, and Ukiah, Plumas-Sierra Rural Electric Cooperative, Port of Oakland, San Francisco Bay Area Rapid Transit (BART), and Truckee Donner Public Utility District—collectively serving nearly 700,000 electric consumers in Central and Northern California.

² The Southern California Public Power Authority (SCPPA) is a joint powers agency whose members include the cities of Anaheim, Azusa, Banning, Burbank, Cerritos, Colton, Glendale, Los Angeles, Pasadena, Riverside, and Vernon, and the Imperial Irrigation District. SCPPA Members collectively serve nearly five million people throughout Southern California. Each Member owns and operates a publicly-owned electric utility governed by a board of local officials who are directly accountable to their constituents.

II. § 95350 - Purpose, Scope, and Applicability: Establish a de minimis threshold:

As we commented in our December 20, 2017 letter, the Utilities Group supports CARB's proposal to extend this regulation to all gaseous media used in gas insulated equipment (GIE) in recognition of the introduction and increased availability of SF6-gas alternatives. We believe that this expanded application warrants establishing a de minimis threshold for exemption from the annual emissions rate. This threshold would apply to some regulated entities that currently operate and maintain a small GIE inventory, as well as to regulated entities that have successfully reduced the use of gaseous media in their GIE inventory. The Utilities Group looks forward to working with CARB staff on setting the appropriate threshold to exempt such entities from the maximum annual emission rate standard while maintaining a mandatory reporting requirement.

III. § 95351 – Definitions: Add key definitions for improved clarity

To address industry changes as alternatives to SF6 gas with zero or significantly lower global warming potential continue to be developed and commercialized, we propose that CARB amend or add the following definitions in the regulation:

“Gas-insulated equipment or GIE” means all electrical power equipment insulated with gas regardless of location. Gas insulated equipment or GIE includes switches, stand-alone gas-insulated equipment, and any combination of electrical disconnects, fuses, electrical transmission lines, transformers and/or circuit breakers used to isolate gas insulated equipment.

“Alternative GWP Technology” means a gas insulating medium in electrical power equipment with a GWP less than that of SF6 as determined using the IPCC AR5 methods and certified by the GIE supplier.

“Zero-GWP Technology” means a non-gas insulating medium utilized in electrical power equipment, including, but not limited to: air, vacuum, oil, and solid-dielectric.

IV. § 95352.1 – Sulfur Hexafluoride Phase Out

The Utilities Group recommends that the phase out apply to the purchase of GIE rather than the installation of equipment. This is important for operational reasons, to allow utilities to maintain their electric power system and replace in-service equipment that has failed in a timely manner, and utilize new or spare equipment already present within the utility's inventory.

The Utilities Group also recommends that the phase out of SF6 GIE be implemented using a tiered schedule starting in 2025 that is dependent upon the commercial availability of non-SF6 equipment for each voltage class of equipment, is cost-effective and does not compromise the safety, reliability and integrity of the electricity system. The tiered phase out schedule should allow sufficient time following commercial availability of the non-SF6 equipment for utilities to a) purchase the non-SF6 equipment through competitive solicitation, b) test the operation and maintenance of such equipment, c) ensure compatibility with existing equipment and electricity systems, and d) provide sufficient time for workforce training and education. Members of the Utilities Group are continuing their evaluation of a tiered phase out schedule for the different types of SF6 GIE and look forward to further discussion with CARB staff on how this can be achieved.

Additionally, we recommend that the phase out requirement only apply to non-hermetically sealed SF6 GIE. Manufacturers design and build hermetically-sealed SF6 distribution switchgear to be “sealed for life” with no routine maintenance required. Moreover, the typical mass of SF6 in distribution equipment

is less than 50 lbs. Since operational emissions from hermetically-sealed GIE are unlikely we believe that it is appropriate to exclude this class of equipment from the SF6 GIE phase out schedule.

V. Add section '§95353.2 Technical Infeasibility Exemption'

We anticipate there will be situations where the use of non-SF6 equipment is technically infeasible, so we propose that the Responsible Official certify a Technical Infeasibility Exemption to support the use of SF6 GIE beyond the phase out date on a case-by-case basis for a particular project or application. Copies of any Technical Infeasibility Exemption Certificates issued during the year would be submitted to CARB as part of the annual SF6 report. We propose the following language to support a technical feasibility exemption:

§95353.2 Technical Infeasibility Exemption: The GIE owner may purchase SF6 GIE beyond the dates specified in §95352 for a specific project or application if the Responsible Official certifies that the use of non-SF6 equipment for the project or application is technically infeasible based on one of the criteria in 95353.2(a).

- (a) A Technical Infeasibility Exemption may be utilized if at least one of the following conditions apply:
 - (1) There is no commercially available non-SF6 equipment meeting the specifications and size requirements for the particular project or application,
 - (2) Available non-SF6 equipment cannot be used for the specific project or application due to size limitations, incompatibility with existing equipment, wiring or connectors, or is deemed not suitable based on safety or reliability requirements,
 - (3) The cost of available non-SF6 equipment is more than 10% higher than the equivalent SF6 GIE,
 - (4) External factors beyond the reporting entity's control which could not have been prevented by the exercise of prudence, diligence, and care preclude the purchase of non-SF6 equipment.

- (b) For each project or application where an exemption is sought, the Responsible Official shall complete a Technical Infeasibility Exemption Certification which will include the following:
 - (1) Entity name and address.
 - (2) Responsible Official name, title, address, phone number and email address.
 - (3) The specific project or application to which the Technical Infeasibility Exemption Certification applies.
 - (4) Description and quantity of electrical equipment to be exempted, including but not limited to GIE equipment type, GIE seal type, GIE manufacturer and model, GIE maximum rated voltage capacity and GIE SF6 Capacity.
 - (5) Summary of bid solicitation and responses received from vendors.
 - (6) The Technical Infeasibility Exemption condition that applies pursuant to subsection §95353.2(a).
 - (7) Explanation of applicable Technical Infeasibility Exemption.
 - (8) Certification signed and dated by the Responsible Official that the information contained in the Technical Infeasibility Exemption Certificate is true and correct.

- (c) A copy of any Technical Infeasibility Exemption Certificate(s) issued during the year shall be submitted to CARB as part of the annual report.

VI. § 95354.1 - Nameplate Capacity Adjustments: Propose additional options

We fully support CARB's effort to allow GIE owners to improve the accuracy of their GIE inventory. However in lieu of the prescriptive method for nameplate capacity adjustments presently in the proposal, we propose the following language:

§95354.1 Nameplate Capacity Adjustments: If the manufacturer's nameplate capacity of devices is determined by the GIE owner to be inaccurate, the owner may establish a new nameplate capacity within 40 years from the manufacture date of the GIE pursuant to (§ 95354.1 (a)-(k)). The GIE owner may also establish a new nameplate capacity using an OEM-approved or an industry accepted standard published by a consensus-based standards organization, including, but are not limited to: IEEE, ANSI and NIST.

Additionally we suggest that the adjustment methodology be provided in separate guidance instead of being included in the regulation.

VII. § 95356 - Annual Reporting Requirements, Annual Emission Rate: Insufficient Credit for SF6 gas alternatives, Alternative calculation methodology

We believe that the methodology in the strawman proposal does not recognize emission reductions resulting from the use of alternative or zero GWP gases and propose an alternative calculation method in Appendix A for your consideration.

Conclusion

We thank you for the opportunity to provide further comment on your strawman proposal and look forward to continuing our work with CARB staff to develop amendments that reflect the state's goal to reduce high GWP gas emissions while ensuring the continued safe and reliable operation of the statewide electricity grid.

APPENDIX A

Proposed Leak Rate Calculation:

The proposed leak rate calculation calculates the emission rate as the sum of the effective emission rates for the different insulating gas media.

$$ER = \sum_{i=1}^n ER_i$$

Where:

ER = Emission Rate

ER_i = Effective Emission Rate of insulating gas i as calculated in the equation

$$ER_i = \frac{\text{Emissions}_i}{C_{\text{avg}}} \times \frac{GWP_i}{GWP_{\text{SF}_6}}$$

Where:

Emissions_i = Annual Emissions of insulating gas i

C_{avg} = Average System Nameplate Capacity for all GIE

GWP_i = GWP of insulating gas i

GWP_{SF₆} = GWP of SF₆

$$C_{\text{avg}} = \frac{\sum_{i=1}^n d_i \times C_i}{365}$$

Where:

C_{avg} = System Nameplate Capacity of GIE in lbs of insulating gas

n = Number of GIE devices

d_i = Number of days during the year the device i was in active service

C_i = Nameplate capacity (lbs.) of GIE in lbs. of insulating gas