SF$_6$ & ALTERNATIVES
COALITION

Carey Bylin
Manage, Energy Section
Project Assessment Branch
California Air Resources Board
1001 I Street
Sacramento, CA 95814

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Via electronic submittal: https://www.arb.ca.gov/lispub/comm/bclist.php

Ms. Bylin,

The SF6 Coalition & Alternatives Coalition (the Coalition) respectfully submits the following comments in response to the California Air Resources Board's (CARB) PROPOSED AMENDMENTS TO THE REGULATION FOR REDUCING SULFUR HEXAFLUORIDE EMISSIONS FROM GAS INSULATED SWITCHGEAR 45-day Language. We commend CARB staff for their willingness to work with industry stakeholders to incorporate recommendations thus far and submit the following for CARB's consideration to clarify and improve the 45-day Language.

§ 95351(a) Definitions and Acronyms.

We understand that CARB may need to include vacuum and solid dielectric in the regulation for purposes of the Early Action Credit. However, the definition of "Gas-Insulated Equipment" or "GIE" should not include equipment that does not contain GHGs. GIE that does not contain GHGs should not be reported under this regulation. We recommend revising the definition of GIE to only include equipment containing GHGs.

Additionally, the definition of GIE in the 45-day language refers to *"…transmission of electric current in electrical power systems."* This phrase may cause some confusion because "transmission" is a term used to describe the movement of electricity at voltages greater than or equal to 72.5kV, and we do not believe it is CARB's intent to limit the definition in this manner.

We also do not see the merit in including hermetically sealed equipment within the definition of "GIE," thereby making all recordkeeping and reporting requirements for GIE applicable. Since hermetically sealed equipment does not impact emissions, we recommend removing it from the definition.

Taking into account the above three comments, we propose the following definition for "GIE":

> *"Gas-Insulated Equipment" or "GIE" means all electrical power equipment, ~~regardless of location and insulating medium (e.g. solid dielectric, vacuum, SF6, alternative gas)~~ that utilizes a covered insulating gas to provide insulating and/or interrupting (arc quenching) functions related to the transmission or distribution of electric current in electrical power systems. GIE includes, but are not limited to, switchgear, switches, circuit switches,*

coupling capacitors potential devices, gas-insulated substations, and/or circuit breakers. ~~This definition includes hermetically sealed GIE and non-hermetically sealed GIE~~."

Additionally, the definition of "Replacement Parts" is too narrow and will preclude certain components (i.e., the interrupter) from being replaced within the spirit of the regulation. We recommend the following: ""*Replacement Parts" are interchangeable components used to repair a GIE."*

Finally, for reasons explained below, we recommend including a definition of 'mass flow meter:' "*a device which measures the instantaneous and cumulative mass of a gas flow.*"

§ 95352(a)(4) SF_6 Phase-Out.

The phase-out language includes a provision that exemptions would apply if replacing "*…a defective SF_6 GIE device at no cost to the GIE owner under the terms of the manufacturer's warranty."*

Because GIE warranty replacements may incur costs such as restocking or shipping fees, we recommend revising this language to *"…a defective SF_6 GIE device ~~at no cost to the GIE owner~~ under the terms of the manufacturer's warranty."*

§ 95354(b)(1) and (d)(1)

The referenced subsections require reporting entities to measure the covered insulating gas transferred to and from GIE meeting certain requirements. The proposed language prescribes the process for these measurements, which involves weighing the gas container before and after the transfer and subtracting the second value from the first, in cases where covered insulating gas is transferred from the container to a GIE, and vice versa in cases where the covered insulating gas is transferred from a GIE to a container.

While this is a viable process to measure the weight of the covered insulating gas, we recommend that CARB add language in both subsections to allow reporting entities to use a mass flow meter to measure the gas. Historically used to measure SF_6, a mass flow meter can be calibrated to measure any covered insulating gas. Mass is not affected by changing temperature and pressure. Thus, a flow meter provides a very accurate account of the gas which is measured as it enters and exits the device.

In order to use a mass flow meter properly, the user simply connects the device via a connection hose between the GIE and the gas cart being used. In this manner, all gas flowing to or from the GIE passes through the mass flow meter. Once the gas cart reaches the required pressure, the mass flow meter yields a mass reading that the user can record.

Allowing reporting entities the option of using a mass flow meter provides several benefits. These benefits include the following:

- The relative ease of process associated with simply taking a reading off of a device as opposed to performing two different weighing functions.
- Use of mass flow meters allows the user to easily account for any gas that remains trapped in the connecting hose between the GIE and the gas cart – use of the described container method does not account for this and relies on the user to remember this important step.
- Many reporting entities have invested in gas transfer processes that involve mass flow meters; not allowing use of these devices would largely turn those investments into a sunk cost.

- Most reporting entities rely on third party contractors for at least some gas handling and maintenance functions. These contractors regularly use mass flow meters to perform these services and, accordingly, not allowing reporting entities to rely on their measurements would be inefficient and unnecessarily time-consuming.

We recommend the following language:

> *(b) Beginning January 1, 2021, for any GIE device that has never been in the GIE owner's inventory as active GIE or that was accounted for in section 95354(c)(1) in a prior data year, and to which covered insulating gas must be added for it to become active GIE, GIE owners shall not add covered insulating gas to a GIE device prior to the data year in which it first becomes active GIE or becomes active GIE after being accounted for in section 95354(c)(1). The amount of covered insulating gas transferred to the GIE device (pounds) must be recorded. To determine the amount of covered insulating gas transferred to the GIE device, a GIE owner may choose either of the following processes:*
>
> > *(1) weigh the gas container being used to fill the device prior to, and after, the addition of the covered insulating gas to the GIE device following the requirements of section 95354(e), and subtract the second value (aftertransfer gas container weight) from the first value (prior-to-transfer gas container weight), or*
> >
> > *(2) connect a mass flow meter between the cart and the GIE and transfer the gas into the GIE. Once the GIE is filled to the temperature corrected pressure or expected weight of gas, close the connection to the GIE from the mass flow meter hose and perform a recovery of the gas trapped in the filling hose through the mass flow meter. Read and record the mass reading on the mass flow meter.*

And;

> *(d) For any GIE device meeting the specifications in sections 95354(c)(1)(A) and 95354(c)(1)(B), covered insulating gas must be removed and evacuated into a covered gas container or containers, and accounted for following the requirements of section 95354(d)(1) in the same year that the GIE device is counted as "removed from regular use." The amount of covered insulating gas transferred out of the GIE device (pounds) must be recorded. To determine the amount of covered insulating gas transferred to the GIE device, a GIE owner may choose either of the following processes:*
>
> > *(1) weigh the gas container being used to receive the covered insulating gas being evacuated from the device prior to, and after, the evacuation of the covered insulating gas from the GIE device following the requirements of section 95354(e), and subtract the first value (prior-to-transfer gas container weight) from the second value (after-transfer gas container weight); or*
> >
> > *(2) connect a mass flow meter between the GIE and the gas cart and evacuate the gas. Once the cart reaches the required pressure, read and record the measurement on the mass flow meter.*

§ 95354(e) and (f) Container Weight.

While many industrial scales are accurate to within 1%, all scales require proper maintenance and calibration; the accuracy can only be as good as the calibration. Scales designed specifically to weigh cylinders and storage racks require much less frequent calibration than other industrial scales so are more likely to render an accurate reading.

Additionally, in order to ensure accurate measurements of gas inside containers, it is important for owners to record and use the tare weight in addition to the gross weight. We recommend the following revisions:

> *(e) Whenever a gas container is required to be weighed, weigh the container on a scale that is certified by the manufacturer to be accurate to within one percent of the true weight and is specifically designed for weighing cylinders, cylinder storage racks and/or storage tanks. In order to calculate the container weight, GIE owners must record the gross weight and tare weight stamped on the container, then subtract the tare weight from the gross weight.*
>
> *(f) GIE owners must weigh covered gas containers at the points in time set forth in sections 95354(f)(1)(A)-(B) and 95354(f)(2). Each time a container is weighed, record the date, the amount of covered insulating gas in the container (pounds), and the reason why the container was weighed (end of calendar year weighing, added to inventory, removed from inventory), and document the tare weight stamped on the container.*

§ 95354(i) Gas Carts.

Most utilities that own and operate SF_6 GIE would opt to purchase a gas cart that can handle SF_6 filling and recovery across different SF_6 GIE sizes and types. Larger volume of SF_6 GIEs will require gas carts with increased size and weight capability. Due to the size and capability requirements, most utilities have gas carts that are permanently mounted on a trailer. Trailer-mounted gas carts would make the Scale Method impractical to implement, since the trailer would have to be weighed for each SF_6 transaction and this would require a vehicle scale that is not readily available in the field.

This would leave utilities with only the Container Method. The Container Method would require the gas cart to be brought up to a pre-determined pressure, then to transfer the gas between the gas cart and the container. We recommend deleting the language in the Container Method that requires reporters to use a pre-determined pressure for transfer between gas cart and container and allow entities to simply recover all gas in the gas cart to a container(s), then to weigh the container(s).

Requiring reporting entities to consistently use the same pre-determined pressure will lead to inaccurate measurements. In order to determine the proper pressure for accurate gas measurements, the GIE owner must first determine the gas temperature, which will be impacted by the ambient temperature. Naturally, ambient temperature is highly variable depending on application (indoor, outdoor, underground), location and season.

Even if GIE owners were allowed to calculate the appropriate pressure for each scenario, this step does not lead to increased accuracy and introduces unnecessary complexities.

Finally, and similar to our recommendation in the preceding section, we recommend that CARB include language allowing reporting entities to measure covered insulating gas in gas carts using a mass flow meter. In this case, the mass flow meter would be connected between the gas cart and the cylinder to measure all gas being recovered into the cylinder.

Accordingly, § 95354(i)(1) and (2) should be amended to read:

> *(1) By January 1, 2021, the GIE owner must determine whether they will account for covered insulating gas in each gas cart using the "container method" following the requirements of sections 95354(i)(2)(A) and 95354(i)(3)(A), ~~or~~ the "scale method" following the requirements of sections 95354(i)(2)(B) and 95354(i)(3)(B) and must, for each gas cart, use the method selected for all subsequent measurements of the amount of covered insulating gas in that gas cart pursuant to section 95354(i)(2-3), or the "mass flow meter method" following the requirements of 95354(i)(2)(C). ~~Whenever a GIE owner elects to use the "container method" for a specific gas cart, the GIE owner shall, by January 1, 2021, select a pressure that they will bring the gas in that cart to prior to each measurement required pursuant to section 95354(i)(2-3). The gas cart must be brought to that pressure prior to making the measurements in section 95354(i)(2-3). GIE owners that elect to use the "container method" for multiple gas carts are not required to select the same pressure for each individual gas cart.~~ Whenever a GIE owner acquires a gas cart after December 31, 2020, they must determine whether they will use the "container method" or the "scale method" at the time the gas cart is acquired.*
>
> *(2) For each gas cart owned by or stored on the property of the GIE owner on December 31 of the data year, either:*
>
> *A. Container method. ~~Bring the gas cart to the pressure specified in section 95354(i)(1) by transferring insulating gas between the gas cart and a covered gas container. Perform this process prior to determining the weight of the covered gas container and recording that weight pursuant to sections 95354(f) and (g); or~~, weigh the gas container being used to receive the covered insulating gas being ~~evacuated~~ <u>recovered</u> from the gas cart prior to, and after, the ~~evacuation~~ <u>recovery</u> of the covered insulating gas from the gas cart following the requirements of section 95354(e), and subtract the first value (prior-to-transfer gas container weight) from the second value (after-transfer gas container weight).; or…*
>
> *B.* [no change]; *or*
>
> *C. Mass flow meter method. Connect a mass flow meter between the gas cart and the container and evacuate the gas. Once the cart reaches the required pressure, read and record the measurement on the mass flow meter.*

As noted, we also recommend replacing "evacuate" with "recover." 'Evacuation' is an industry term that refers to the removal of air and moisture. 'Recover' refers to the transfer of gas, which we believe to be the intended meaning of this language.

§ 95357(j) SF_6 Phase-Out Exemption.

We support new language to allow for multiple GIEs of the same type to be exempted under one application. However, limiting the validity of the application to 24 months may be challenging and will create additional burden for utilities to either:

a. Install/replace all equipment of the same type within a 24-month period, or
b. Resubmit/restart a new procurement process to acquire non-SF_6 GIE after 24 months, where most likely, equipment would still be unavailable.

Alternatively, we recommend revising the 45-day Language as follows:

> *"A GIE owner with an approved SF_6 phase-out exemption may ~~acquire~~ identify and order the specific SF_6 GIE described in the SF_6 phase-out exemption within 24 months of CARB's approval request…."*

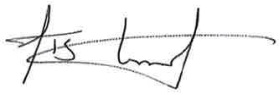
Use of "Voltage Capacity" (Multiple Sections)

Several times throughout the 45-day Language, CARB uses the term "voltage capacity." "Voltage" and "Capacity" are two different terms with different meanings; their usage together here is not technically accurate. "Voltage" is the electric potential between two points (i.e. on a conductor) while "capacity" generally refers to the maximum electric output an electricity generator can produce. We recommend that CARB replace "voltage capacity" with "voltage ratings" in each instance throughout the proposed language.

Closing

Thank you for this opportunity to provide further comments. Please contact Jonathan Stewart (jonathan.stewart@nema.org) with any further questions.

Sincerely,



Jonathan Stewart
Industry Director, Utility Products & Systems
National Electrical Manufacturers Association, on behalf of
The SF_6 & Alternatives Coalition

About the SF_6 and Alternatives Coalition

Formerly named *The Electric Transmission & Distribution SF_6 Coalition*, the SF_6 & Alternatives Coalition is comprised of 17 members who are producers and distributors of SF_6 and SF_6 alternatives, manufacturers of gas-insulated equipment, a California utility, and other SF_6 stakeholders. Our mission is to:

1) provide a forum for equipment manufacturers using SF_6, SF_6 producers and distributors, and transmission and distribution equipment owners for discussion of environmental concerns of SF_6 as a greenhouse gas;

2) develop best practices and recommendations related to sustainable SF_6 usage in electric power transmission and distribution;

3) advocate the Coalition positions to federal, state, and local policymakers;

4) educate public and private stakeholders on SF_6 alternatives; and

5) maintain liaisons with government and industry groups such as U.S. EPA, Institute of Electrical and Electronic Engineers (IEEE), EEI, IEC, CIGRE, and EPRI.