SMUD®

December 19, 2017
LEG 2017-0632

Dave Mehl, SF_6 Program Manager
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: Sacramento Municipal Utility District's Comments to Proposed Amendments to Regulation for Reducing SF_6 Emissions from GIS, 17 CCR, Sections 95350-95359

Dear Mr. Mehl:

SMUD appreciates the opportunity to comment on the "Strawman" amendments to the Regulation for Reducing SF_6 presented at the November 28th CARB workshop. This letter intends to present a preliminary, high level overview of SMUD's responses. We look forward to continuing collaboration with CARB staff in the upcoming months as we strive to achieve the common goals of improved reporting accuracy and advancing GHG reduction efforts in California.

SMUD is gratified that CARB has reopened the Regulation, and we would like to propose the following for CARB's consideration.

Flexibility

It is SMUD's understanding that one aspect to consider in the proposed regulation is increased "flexibility." SMUD suggests an increasing need for flexibility as the SF_6 emission rate reaches 1% in 2020 and thereafter. At this low emission rate percentage, entities may find themselves inadvertently in danger of non-compliance due to a singular event that does not clearly meet the "Emergency Event" criteria in the regulations.

For example, an entity that consistently has leakage rates well below the 1% limit may be in violation if in one year a GIE event happens to release above the 1% limit. On the other hand, an entity whose emissions are just below the 1% limit could, over time, emit significantly more SF_6 than the first entity.

In addition, other than ensuring compliance, the proposed Strawman offers no incentive to reduce SF_6 emission rates below the annual percentage limit. Some method to recognize emission rates below 1% may provide an additional incentive to focus on reducing leakage.

As the original SF_6 regulations were developed in 2009-2010, some stakeholders recommended flexibility mechanisms such as a multi-year rolling average for determining leakage against the limit, or allowing a degree of "banking" of emission rates below the limit to offset any unforeseen emission rate exceedance in one year. Initially, when the SF_6 emission rate was relatively high at 10% and declining from that high level, banking or rolling average mechanisms may have led to significant amounts of banking. However, since the revised regulations will take effect in 2018 at the earliest, the potential for significant banked credit is low, thus limiting the potential to offset emissions above the 1% or 2% limits. SMUD believes that even a modest amount of banking would help to stabilize the 1% limit in 2020 and beyond.

SMUD has organized the remainder of our comments by Section in the Strawman document.

§ 95351. Definitions

SMUD requests that CARB clarify the following definitions:

(a)(2) **"Adjusted System Nameplate Capacity"** should explicitly state if this applies to non-hermetically sealed equipment exclusively or if hermetically-sealed GIE is also impacted. The proposed definition of the "Emission Rate" is based on the adjusted system nameplate capacity. It is important that regulated entities have a clear understanding of how the "Emission Rate" is calculated. In the current Strawman, the "Emission Rate" explicitly states that it only accounts for active GIE, which excludes hermetically sealed GIE.

(15) Provide a definition for **"Equipment Voltage"** to clarify that GIE nameplate capacity for zero global warming potential (GWP) technologies will apply to "Rated" voltage (as opposed to "System" or "Operational" voltage).

(16) Provide a definition for **"Vacuum Breaker."**

§ 95352. Maximum Annual Emission Rate

SMUD fully supports the emission rate limits for gases with greater than zero GWP. However, we advocate that low and zero GWP gases receive appropriate credit in the adjusted system nameplate capacity, as discussed in our comments to section § 95356.

§ 95352.1. Sulfur Hexafluoride Phase Out

a. January 1, 2025 Phase Out Deadline
While SMUD supports the goal of reducing GHG emissions from SF_6, the reliability of the electrical system (and the personal safety of our staff and the public) is paramount. Thus, the elimination of SF_6 GIE must be implemented conservatively and cautiously. The proposed January 1, 2025, deadline for SF_6 phase out in all new GIE may be too aggressive a target and, as such, would be detrimental to safety and reliability.

SF_6 is an extremely stable gas. It is an excellent insulating medium with a proven track record for efficiency, safety, and reliability for use in electrical applications. The functional and economic feasibility of alternative non-SF_6 technologies must be thoroughly vetted before being integrated into the electrical system as a replacement to SF_6. Important considerations might include functionality (e.g., effectiveness in overhead or underground applications); voltage classes (low to high voltages); proper training to handle multiple types of GIE; and, existing physical area (e.g., dimensional constraints of installations and replacements). A thorough evaluation of all aspects of any substitute technology proposed is necessary to safeguard the reliability of the electrical system (and its workers) and will require ample time to execute correctly.

b. No "Installation" Clause
Setting a sunset date on the prohibition of SF_6 "*installed in California*" would lead to unnecessary waste due to entities being unable to install spare SF_6 GIE stored in their inventories after 2024. In addition, the current language is unclear on whether this also covers hermetically sealed GIE.

While stockpiling purchases of spare SF_6 GIE in inventory is a legitimate concern, transparency in CARB reporting (e.g., inactive GIE is reported annually) will allow CARB to monitor any "spikes" in purchases.

c. Prohibition on Conversion of Existing Devices to SF_6 GIE
SMUD finds the following proposed language unclear: *"nor shall an existing device be converted to use sulfur hexafluoride…"* What is meant by "an existing device?" Does this refer to only non-SF_6 devices or does it include SF_6 GIE? If it is CARB's intent to restrict regulated entities from replacing existing SF_6 GIE with new SF_6 devices, then SMUD opposes this approach. Our primary concern with this restriction is that spacing constraints on existing infrastructure may prevent installation of different-sized non-SF_6 equipment. For example, this may be unrealistic in dense, urban sites or in tight underground applications. Providing an exemption for comparable or "like for like" SF_6 GIE replacements in these situations would alleviate this issue.

d. SF_6 Phase Out
SMUD's subject matter experts are continuing to consider the potential options and come to a determination on the viability of non-SF_6 technologies. At this point, we are uncertain of the timing of this determination. We cannot support a strict phase-out of all SF_6 equipment by 2025 at this time, but may be open to a phased or tiered phase-out in the future, depending on the results of our analysis of alternatives.

§ 95353. Emergency Event Exemption

SMUD requests that the revised Regulation clarify how Emergency Event Exemptions are weighted with respect to an entity's emission rate. It is unclear from the current regulatory language exactly how the Exemption is applied when reporting SF_6 emissions.

In SMUD's experience, it seems that Exemptions are approved by CARB only when the loss results in non-compliance or exceedance of the Maximum Annual Emission Rate. If this is indeed the case, then perhaps CARB should clarify this nuance in the proposed Regulation, so that entities can determine when an Exemption request submittal is practical.

§ 95354.1. Nameplate Capacity Adjustments

SMUD applauds CARB for acknowledging industry concerns to improve the accuracy of reported GHG emissions. During the course of daily operations, SMUD has encountered several instances where actual gas amounts inside GIE differ from the nameplate stamped on the device, even in controlled environments. Consequently, we fully support CARB's efforts to deliver a process for nameplate capacity adjustments.

In order to afford greater flexibility for both CARB and regulated entities, SMUD recommends the following:

1) Additional Options for Establishing New Nameplate Capacity
While a standardized, CARB-endorsed procedure for nameplate adjustment is essential to ensure accuracy and consistency among reporters, we ask that the Regulation incorporate an "Option B" (e.g., substitute processes for establishing new nameplate capacities to be determined by the regulated entity).

2) January 1, 2023, Deadline
SMUD urges CARB to reconsider setting a specific timeframe or "window" for nameplate capacity adjustments. SF_6 GIE typically has a lifetime of 30-50

years. GIE currently in service will be retired gradually over several decades. Because nameplate inaccuracies are only realized when GIE is taken out of service (for maintenance or retirement), a limited timeframe for nameplate adjustments is impractical. Due to the longevity of SF_6 GIE, devices may exhibit nameplate capacity inaccuracies for many years.

Moreover, a firm deadline may unnecessarily increase the risk of emissions as regulated entities rush to accomplish nameplate assessments prior to the CARB deadline. It is SMUD's intention to establish new nameplate capacities on a case-by-case basis, as GIE are taken out of service, because performing blanket nameplate adjustments on active GIE introduces greater risk of emissions.

3) 2011 Limitation on Manufacture Date of GIE
SMUD opposes restricting nameplate capacity adjustments to devices manufactured prior to 2011. The majority of SF_6 manufacturers do not presently provide guarantees for nameplate accuracy, so even GIE manufactured after 2011 may continue to present nameplate inaccuracies. While SMUD supports that a nameplate adjustment may only be undertaken once for each GIE device, adjustments should be applicable to all equipment, including those manufactured *after* 2011 so that emissions from newer equipment may also be accurately captured and reported.

Additionally, certain maintenance activities may affect GIE nameplate capacity. For instance, bushing and interrupter change-outs or adjustments to internal GIE components can occur at any time and may result in nameplate variances. Restricting nameplate adjustments to devices manufactured prior to 2011 will cause these variances to be overlooked.

4) Retroactive Reporting
While SMUD is wholeheartedly in favor of measures to improve SF_6 emissions reporting accuracy, SMUD strongly opposes retroactive reporting of adjusted nameplate capacities because the complexities of retroactive reporting far outweigh the minimal benefits that may be realized.

   a. This process would be overly burdensome for regulated entities given the level of effort required to comply with retroactive reporting.

   b. Current recordkeeping requirements only require SMUD to maintain three years of historical data. SMUD may not have sufficient data to recreate reports that were submitted more than three years ago.

c. Due to the nature of SF_6 data, revisions to CARB annual reports would have other substantial implications (i.e., a trickledown effect on additional GHG reporting). For instance, any modifications to CARB SF_6 reports would require entities to adjust submittals to other agencies that must be kept consistent with CARB. For example, the US EPA or The Climate Registry.

d. For most years, the impact of a nameplate capacity adjustment would only affect the denominator in the Mass Balance calculation. The effect upon the Maximum Annual Emission Rate for these years would be so minimal that it would not merit the efforts associated with extensive retroactive reporting.

e. When equipment is put into or taken out of service, there would be a minimal impact on the numerator (i.e., the "net increase in total nameplate capacity" would be impacted). However, the majority of GIE installations were done before the SF_6 regulation was effective, and emission data for these years may not be readily available.

§ 95356. Annual Reporting Requirements

SMUD supports the adoption of regulatory language that will encourage reporters to consider non-SF_6 alternative technologies, and we appreciate CARB's intention to provide credit to entities that utilize zero or low GWP solutions. This positive action would yield double dividends by encouraging reporters to implement non-SF_6 options, while signaling GIE manufacturers to continue to invest their capital resources into developing environmentally-friendly substitutes to SF_6. However, the shift towards non-SF_6 technology also represents a considerable capital investment for regulated entities and some measure of regulatory certainty would be desirable.

1) Capacity Adjustment Factor (A_i)
The capacity adjustment factor in § 95356(e) does not seem to provide adequate credit for replacing SF_6 GIE with non-SF_6 devices. The capacity adjustment factor for GWP of less than 10 seems to be too low; and, the assigned value of "1 lb for every 1,000 volts" for zero GWP technology is insufficient. The danger is that entities may inadvertently retain SF_6 devices for as long as possible in any given year, in order to preserve the higher denominator. This is contrary to the Regulation's intent.

The solution requires striking a delicate balance. As currently presented, switching to non-SF_6 GIE could result in emission rate increases. Conversely, a capacity adjustment factor that is too high would essentially negate the Regulation. SMUD therefore requests CARB revisit the capacity adjustment

factor to ensure that reporters who switch to alternatives will not see a spike in their emission rates.

As always, SMUD appreciates the opportunity to comment on the Strawman proposal, and we look forward to the ongoing dialogue with CARB in the upcoming months as we strive to formulate solutions to enhance the positive impacts of the SF_6 Regulation.

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