



CALPINE CORPORATION

4160 Dublin Boulevard
Suite 100
Dublin CA 94568
925.557.2238

Electronically filed at: https://www.arb.ca.gov/lispub/comm2/bcsubform.php?listname=sf6regmodifications-ws&comm_period=1

December 20, 2017

Dave Mehl, Energy Section Manager (Program Manager)
Rosa Lopez, Air Resources Engineer (Lead Staff)
California Air Resources Board
1001 I Street, Sacramento, California 95814

Subject: Comments on Public Workshop to Discuss Regulatory Modifications to Facilitate the Reduction of Greenhouse Gas Emissions from Gas Insulated Equipment and Strawman Version of Potential SF₆ Regulation Changes

Dear Mr. Mehl and Ms. Lopez,

Calpine Corporation (“Calpine”) is writing to provide comments in follow-up to the November 28, 2017 Public Workshop to Discuss Regulatory Modifications to Facilitate the Reduction of Greenhouse Gas Emissions from Gas Insulated Equipment and the Strawman Version of Potential Changes to the Regulation for Reducing Sulfur Hexafluoride (“SF₆”) Emissions from Gas Insulated Switchgear (the “potential amendments” to the “Regulation”).

Calpine Corporation is America’s largest generator of electricity from natural gas and geothermal resources. Our fleet of 80 power plants in operation or under construction represents approximately 26,000 megawatts of generation capacity. Through wholesale power operations and our retail business, we serve customers in 25 states, Canada and Mexico, and generate enough electricity to power over 20 million homes. We specialize in developing, constructing, owning and operating natural gas-fired and renewable geothermal power plants that use advanced technologies to generate power in a low-carbon and environmentally responsible manner.

Calpine is a long-time supporter of the California Global Warming Solutions Act of 2006, the Air Resources Board’s (“ARB”) Cap-and-Trade Program, and California’s long-standing goals of reducing economy-wide greenhouse gas (“GHG”) emissions to 40% below 1990 levels by 2030, as codified by Senate Bill 32, and 80% below 1990 levels by 2050, as first established in Executive Order S-3-05. Calpine also shares ARB’s goal of achieving greater GHG emission reductions from gas-insulated equipment (“GIE”), and generally supports ARB’s proposal to modify and update the Regulation to integrate alternative insulating gases and technologies in place of SF₆. However, as discussed below, Calpine believes that ARB should consider modifying its proposal to level the playing field among owners of GIE, address the current uncertainties facing alternative

gases and technologies, and encourage more owners to undertake nameplate capacity adjustments and thereby improve the accuracy of reported emissions rates.

Consolidated Reporting and Compliance. Under the current Regulation, companies like Calpine with facilities that are each owned by independent limited liability companies (“LLCs”) must treat each LLC as a separately-regulated owner.¹ Not only is this administratively inefficient, but it subjects facilities with few or only one piece of gas-insulated equipment to impractically narrow emission rate targets that approach the limits of current measurement technology. For instance, Calpine’s subsidiary Agnews facility has only one breaker with 141 pounds (lbs) of SF₆ capacity. For calendar year 2020 and thereafter, Agnews will be limited to a maximum of 1.41 lbs of leakage. By contrast, a large consolidated utility company with an inventory in excess of 100 breakers, and capacity in the thousands of pounds, is afforded a significantly greater margin of compliance through its ability to average its emission rate across all company-wide GIE and thereby compensate for any individual equipment-specific leaks.

Calpine is committed to reducing SF₆ emissions and has invested significant time and resources in the installation of state-of-the-art measurement technology at a facility owned by one of its corporate subsidiaries. That facility, which was commissioned in 2013, is subject to the first-ever best available control technology (“BACT”) limits on GHG emissions to be included in a prevention of significant deterioration (“PSD”) permit. These limits not only set the precedent for how to develop GHG BACT limits more generally,² but provided the example for limits on emissions of SF₆, which have been closely followed in subsequent PSD permits issued by U.S. EPA and state permitting authorities for other power plants.³ Yet, as Calpine has learned, the monitoring equipment installed by the original equipment manufacturer (“OEM”) for purposes of monitoring SF₆ leaks does not provide the degree of accuracy needed to assure compliance with leak rates as low as imposed by its permit.

Rather, readings provided by the facility’s OEM-installed pressure gauges are highly susceptible to changes in ambient temperature and pressure, such that small changes in observed pressure do not necessarily correlate with changes in mass of SF₆. This reflects the fact that the OEM-installed gauges were designed primarily to detect significant leakage that could result in damage to the breaker and not for the purpose of assuring compliance with GHG limits.

To improve upon the OEM-installed monitoring equipment, Calpine’s subsidiary installed a state-of-the-art, custom-designed monitoring system consisting of the BWatch3 Optimum system. This

¹ The Regulation applies generally to “owners” of gas-insulated switchgear (“GIS”). See Cal. Code Reg. tit. 17, § 95350(b); see also Sulfur Hexafluoride (SF₆) Emission Reductions from Gas Insulated Switchgear (GIS) – FAQs, no. 47), <https://www.arb.ca.gov/cc/sf6elec/faq/faq.htm#47> (“As each LLC is an independent entity that legally owns the GIS at a facility, each LLC would be individually subject to the regulation. Each facility would have to meet all obligations independently, including the emission rate, recordkeeping, and reporting requirements.”).

² See Congressional Research Service, L. Parker and J. E. McCarthy, *EPA’s BACT Guidance for Greenhouse Gases from Stationary Sources*, CRS Report R41505 (Nov. 22, 2010), at 17.

³ See, e.g., Prevention of Significant Deterioration Permit Issued Pursuant to the Requirements at 40 CFR § 52.21, for Palmdale Hybrid Power Project, PSD Permit No. SE-09-01, U.S. EPA Region 9, Oct. 18, 2011, at 12-13.

also necessitated the development of unique system logic and programming to transmit the raw data from the sensors to the facility's distributed control system, where changes in mass are then calculated and an alarm is activated in the event such changes are observed. The costs associated with installation, commissioning and programming of the advanced monitoring system were significant, as evidenced by information previously provided to ARB under separate cover and claim of confidentiality. Such costs would not be justified for other facilities and are not cost-effective, in comparison to other GHG reductions, given the small amount of GHG emissions that might be prevented by improved monitoring accuracy.

A larger owner that maintains a significant number of GIE across multiple facilities throughout the state can simply rely upon the mass balance required for reporting emissions under the Regulation to assure compliance with the Regulation's annual leak rates, as it is afforded the benefit of averaging emissions rates across its entire fleet of GIE. In contrast, single-facility LLCs are afforded no such benefit. While Calpine strives to minimize SF₆ leaks at all its subsidiaries' facilities, there is no legitimate rationale for affording large, consolidated "owners" of GIE so much greater of a compliance margin, in comparison to owners of an individual facility, which may exceed the Regulation's annual leak rate as a result of a relatively small leak from a single piece of equipment. Nor is there any reason for imposing a competitive disadvantage on such owners merely because their corporate structure necessitates ownership of individual facilities and, in some cases, pieces of GIE, by separate entities.

To correct this imbalance, Calpine proposes that ARB amend the Regulation to authorize consolidated reporting and compliance, such that a parent company of a number of corporate subsidiaries could report and demonstrate compliance on a true fleet-wide basis on the same footing as other large, consolidated owners of GIE within California. Specifically, Calpine proposes that ARB redefine "GIS owner" to allow a parent corporation of a number of otherwise separately-regulated companies under its common ownership and control to report and comply on a consolidated basis, upon the mutual election of both the parent and subsidiary entities. This would acknowledge the different corporate structures of GIE owners within California, while assuring that all such owners effectively comply with the same maximum emission rates across their respective fleets.

As an alternative, ARB could provide a standard leak rate alternative to the 1% limit. For example, the Regulation could provide that the annual leak rate for years 2020 and beyond is 1% or 10 lbs, whichever is greater. Such a mass-based alternative to the percentage rate limit would still achieve the reductions ARB is seeking through implementation of the leak rate limitations, while affording smaller GIE owners relief from penalties in the event that a small change in inventory exceeds the 1% threshold.

De Minimis Threshold. Calpine recognizes and appreciates why ARB declined to establish a *de minimis* threshold under the existing Regulation in the first instance, given the extraordinary global warming potential of SF₆ in relation to other GHGs. However, as ARB contemplates modifying the Regulation to incorporate less-impactful insulating gases and technologies and as the maximum emission rate continues to drop, Calpine encourages ARB to revisit establishing a *de minimis* threshold to accommodate owners with only a very small amount of gas-insulated equipment. The need for such a *de minimis* threshold becomes more acute to the extent that ARB

is unwilling to authorize fleet-wide reporting and compliance for all regulated owners or provide a mass-based alternative to the percentage leak rate limitation, as described above.

SF₆ 2025 Phase-Out. While Calpine supports ARB's goal of encouraging and facilitating the replacement of SF₆ as an insulating gas, Calpine is concerned with ARB's proposal to set an arbitrary deadline of January 1, 2025,⁴ after which no new gas-insulated equipment utilizing SF₆ may be installed. Calpine does not support a full phase-out beginning this soon, as current replacement technology is not commercially ready, nor is it clear that it will be ready for deployment and tested in all relevant settings by 2025. For instance, as equipment becomes available in the coming years, it is likely to be at limited voltages and not ready for deployment in all of the varying voltage scenarios confronting owners subject to the Regulation. Moreover, owners will need additional time – after commercial availability – to conduct testing and site-specific engineering and training to ensure future installations are safe, seamless, and do not jeopardize grid reliability or the integrity of connected equipment.

Rather than establish an arbitrary deadline in the near future to prohibit the installation of gas-insulated equipment utilizing SF₆, Calpine would encourage ARB instead to focus on ensuring appropriate credit and recognition is given to the voluntary use of alternative gases and technologies with substantially-lower global warming potential in the calculation of emission rates. This would provide greater incentive for owners to replace equipment utilizing SF₆ with such alternatives whenever feasible, without risking potential reliability risks in the event GIE needs to be replaced in 2025 or later and technology has not advanced by that time to make possible the complete elimination of SF₆ from new installations. In addition, if CARB insists on putting a date on the phase-out, the Regulation should include an emergency relief exemption to accommodate unforeseen emergencies that could affect plant or grid reliability.

Nameplate Capacity Adjustments. Calpine supports ARB's proposal to allow nameplate capacity adjustments, although this provision should neither be limited to equipment manufactured before 2011, nor adjustments undertaken before January 1, 2023. Nor do we believe that claiming an adjustment should require amendment of prior annual reports.

In Calpine's experience, even equipment manufactured as recently as a few years ago can have a nameplate capacity that is inaccurate. For example, Calpine discovered such inaccuracies in the nameplate rating of certain equipment at a facility commissioned in 2013. While we presume ARB has proposed limiting the adjustment to equipment manufactured before 2011 because that year coincides with initial adoption of the Regulation, nothing in the Regulation itself required greater accuracy in nameplate capacities for equipment manufactured after that date.

⁴ Calpine also notes that, as indicated in the proposed amendments, it appears 2030 was initially identified as the proposed phase-out deadline, before being subsequently modified to 2025. See potential amendments to Regulation, § 95352.1 (“[Beginning January 1, 203025. . .](#)”). To the extent ARB finds a mandatory phase-out date to be essential, Calpine urges ARB to closely evaluate the actual technical feasibility for alternative technologies, rather than simply choose an arbitrary date, and consider the role that reductions attributable to the phase-out are expected to play, if any, in achieving SB 32's 2030 target and whether an earlier date for the phase-out (i.e., by 2025) is critical to achieving any such reductions.

Only in recent years, as owners have begun to comply with increasingly stringent limits on emissions of SF₆, has it become clear that nameplate capacities are not always accurate and can depart from actual capacity by an amount that, on its own, could indicate an exceedance of such limits. We believe that adopting a provision like this as part of the amended Regulation would send a strong enough signal to manufacturers and purchasers of new GIE alike, such that nameplate capacities for equipment manufactured after the date of adoption should be more accurate. Accordingly, we would recommend that the limitation on manufacture date be based on the date when the amended Regulation is adopted.

Calpine also does not believe that the adjustment should only be allowed if undertaken prior to January 1, 2023. An owner is likely to undertake a nameplate capacity adjustment for equipment in the event that the electric generating facility it serves is undergoing a major maintenance event (i.e., during an outage) or a leak is discovered. In many cases, however, certain electric generating facilities may not be scheduled for a major maintenance event prior to the January 1, 2023 date. Failing to allow adjustments after that date would only prolong inaccurate nameplate capacities and, as a consequence, result in less accurate emissions reporting. The amendments should instead be designed to encourage owners to improve the accuracy of emissions reports on a prospective basis, even if the relevant facility does not undergo a major maintenance event or have a leak before 2023. Accordingly, Calpine recommends deleting the January 1, 2023 limitation in its entirety.

Finally, Calpine does not believe the potential amendments should require GIE owners to amend prior annual reports to reflect revised nameplate capacities and emission rates, as proposed by the final paragraph of proposed section 95354.1. Requiring owners to amend previously submitted reports would act as a disincentive to owners undertaking the adjustment, as there is always a risk that the capacity could change in a way that results in previously reported emission rates exceeding the limit applicable during an earlier year. Additionally, it would be legally problematic for CARB to seek enforcement in such instances, when the relevant statute of limitations may have already passed on any historic leak and resulting emissions rate exceedance. Rather, Calpine believes the amendments should be designed to encourage more accurate reporting prospectively and no amendment of prior reports should be required in the event of nameplate capacity adjustments.

* * * *

Thank you for the opportunity to submit these comments. Please contact me if you have any questions at 925.557.2238 or barbara.mcbride@calpine.com.

Sincerely,



Barbara McBride
Director, Environmental Services
Calpine Corporation