TECHNICAL SUPPORT DOCUMENT FOR PROCESS EMISSIONS OF SULFUR HEXAFLUORIDE (SF_6) AND PFCs FROM ELETRIC POWER SYSTEMS:

PROPOSED RULE FOR MANDATORY REPORTING OF GREENHOUSE GASES

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Office of Air and Radiation

U.S. Environmental Protection Agency

Contents

1. Source Description

The largest use of SF_6, both in the United States and internationally, is as an electrical insulator and interrupter in equipment that transmits and distributes electricity (RAND 2004). The gas has been employed by the electric power industry in the United States since the 1950s because of its dielectric strength and arc-quenching characteristics. It is used in gas-insulated substations, circuit breakers, other switchgear, and in gas-insulated lines. Sulfur hexafluoride has replaced flammable insulating oils in many applications and allows for more compact substations in dense urban areas. Currently, there are no available substitutes for SF_6 in high voltage applications.

Fugitive emissions of SF_6 can escape from gas-insulated substations and switch gear through seals, especially from older equipment. The gas can also be released during equipment manufacturing, installation, servicing, and disposal.

PFCs are sometimes used as dielectrics and heat transfer fluids in power transformers. PFCs are also used for retrofitting CFC-113 cooled transformers. One PFC used in this application is perfluorohexane (C_6F_{14}). In terms of both absolute and carbon-weighted emissions, PFC emissions from electrical equipment are generally believed to be much smaller than SF_6 emissions from electrical equipment; however, there may be some exceptions to this pattern (IPCC, 2006).

a. Total U.S. Emissions

Emissions of SF_6 from an estimated 1,364 electric power system utilities[1] were estimated to be 12.4 Tg CO_2 Eq. in 2006 (EPA 2008). EPA does not have an estimate of PFC emissions from electric power system utilities.

b. Emissions to be Reported

EPA is requiring electric power systems to report all SF_6 and PFC emissions, including those from equipment installation (once the title of equipment has been transferred to the equipment user), equipment use, and equipment decommissioning and disposal.

c. Facility Definition Characterization

The General Provisions for the Mandatory Reporting Rule, 40 CFR Part 98 Subpart A, define a facility as “any physical property, plant, building, structure, source, or stationary equipment located on one or more contiguous or adjacent properties in actual physical contact or separated solely by a public roadway or other public right-of-way and under common ownership or common control, that emits or may emit any greenhouse gas.” But this definition is not suitable for an electric power system since the electrical equipment that comprises an electric power system is typically at numerous substations that are not contiguous to each other but are instead connected by electrical lines. Using the Subpart A definition of a facility could lead to an electric power system being subdivided into many different facilities due to equipment that is geographically separated from other equipment even if the equipment is connected by electrical lines. This could introduce confusion in calculating whether a facility exceeds the reporting threshold and in determining the boundary between facilities. Therefore, the Subpart A definition is not considered an appropriate definition for this source category.

To identify an appropriate definition of a facility, EPA first considered the following levels of reporting: per piece of equipment, per substation or switchyard, and corporate-level. Reporting per piece of equipment or per substation was deemed costly and highly impractical for reporters, primarily due to the high number of substations and pieces of equipment that are operated by a utility. A large utility can have thousands of substations that each include many pieces of SF_6-insulated equipment. Reporting SF_6 emissions from each piece of equipment would not only involve a significant labor burden, but could also overlook emissions that occur during SF_6 handling. Reporting emissions by

[1] The estimated total number of electric power system (EPS) utilities includes all companies participating in the SF_6 Emission Reduction Partnership for Electric Power Systems and the number includes non-partner utilities with non-zero transmission miles. The estimated total number of EPS utilities that emit SF_6 likely underestimates the population, as some utilities may own high-voltage equipment yet not own transmission miles. However, the estimated number is consistent with the U.S. inventory methodology, in which only non-partner utilities with non-zero transmission miles and partner utilities are assumed to emit SF_6.

substation would require setting up a separate mass-balance accounting system for each substation, which would involve a significant labor burden and does not reflect the way that utilities handle bulk gas across substations (gas is usually purchased and stored in a centralized fashion for use in numerous substations). Corporate-level reporting can raise issues because the ownership structure in the electric power industry can be very complex. In addition, utilities in the electric power industry are owned and operated by numerous types of public and private entities, which can include an investor-owned company, an electric cooperative, a public electric supply corporation, a federal government agency, a municipally owned electric department, an electric public utility district (PUD), and a jointly owned electric supply project (EIA 2007). These myriad and potentially complex ownership structures could introduce the potential for under reporting, double-counting, or other reporting issues if reporting is required on a corporate-level.

EPA also considered electric power system level reporting, under which the electric power system would be considered an aggregation of equipment that is interconnected and shares a common owner or operator. Several advantages exist with this type of system level reporting. For example, system level reporting is consistent with the way that most utilities track their SF_6 use and is conducive for using IPCC's Tier 3 utility-level mass-balance approach to emissions monitoring. The Tier 3 utility-level mass balance approach has been proven to be a practical and reasonable approach for the more than 80 utilities that currently participate in EPA's SF_6 Emission Reduction Partnership for Electric Power Systems. Reporting emissions from the aggregation of electrically connected equipment also reduces the ambiguity associated with defining the boundary of the system by not making the boundary dependent on the different types of corporate or operational structures, which can be very complex.

A variety of definitions were reviewed to identify a definition for an electric power system that best captures this aggregation of interconnected equipment in the context of mandatory reporting. As summarized in Table 1, EPA reviewed current definitions from the Federal Energy Regulatory Commission (FERC), North American Energy Reliability Corporation (NERC), California Air Resources Board (CARB), the Regional Greenhouse Gas Initiative (RGGI), and the Energy Information Administration of the Department of Energy (EIA). EPA also consulted with members of industry (U.S. Electric Power Utility Representatives, 2009) in addition to reviewing current regulations relevant to industry.

Table 1: Alternative Options for Facility Definition

Source	Term	Definition
FERC[a]	Transmission	"Moving bulk energy products from where they are produced or generated to distribution lines that carry the energy products to consumers." (FERC 2010)
	Distribution	"For natural gas - the act of distributing gas from the city gate or plant to the customer. For electric - the act of distributing electric power using low voltage transmission lines that deliver power to retail customers." (FERC 2010)
	Facility	"A set of electrical equipment that operates as a single Bulk Electric System Element (e.g., a line, a generator, a shunt compensator, transformer, etc.)." (FERC 2010)
NERC	Distribution Provider	"Provides and operates the "wires" between the transmission system and the end-use customer. For those end-use customers who are served at transmission voltages, the Transmission Owners also serves as the Distribution Provider. Thus, the Distribution Provider is not defined by a specific voltage, but rather as performing the Distribution function at any voltage." (NERC 2010)
	Transmission	"An interconnected group of lines and associated equipment for the movement or transfer of electric energy between points of supply and points at which it is transformed for delivery to customers or is delivered to other electric systems." (NERC 2010)
CARB	Electrical Power System	"means the combination of electrical generators (i.e., power plants), transmission and distribution lines, equipment, circuits, and transformers used to generate and transport

		electricity from the generator to consumption areas or to adjacent electrical power systems." (CARB 2007)
RGGI	Transmission and/or distribution entity	"The assets and equipment used to transmit and distribute electricity from an electric generator to the electrical load of a customer. Includes all related assets and equipment located within the service territory of the entity, defined as the service territory of a load-serving entity specified by the applicable state regulatory agency." (RGGI 2008)
EIA	Electrical Power System	"An individual electric power entity--a company; an electric cooperative; a public electric supply corporation as the Tennessee Valley authority; a similar Federal department or agency such as the Bonneville Power Administration; the Bureau of Reclamation or the Corps of Engineers; a municipally owned electric department offering service to the public; or an electric public utility district (a "PUD"); also a jointly owned electric supply project such as the Keystone." (EIA 2007)

[a]FERC does not define electric power system; but rather, their glossary defers to the EIA energy glossary for this term.

The alternative definitions listed in Table 1 do provide language that is inclusive of different types of electrical utilities as well as different types of transmission and distribution equipment. However, the alternative definitions lack the level of specificity and completeness required to be used on their own to define electric power systems for mandatory reporting. Specific issues regarding the alternative definitions and their applicability to mandatory reporting are as follows:

- FERC: fragmented between transmission and distribution; unclear boundaries between systems.
- NERC: fragmented between transmission and distribution; unclear boundaries between systems.
- CARB: unclear boundaries between systems..
- RGGI: based on the service territory of the load-serving entity, but some SF_6 insulated electrical equipment is used by owners/operators who do not have a service territory (i.e., transmission-only companies).
- EIA: outlines different entities that can be considered electric power systems, but unclear about boundaries between systems as well as the physical assets that constitute an electric power system.

After a thorough review of these alternative definitions, it became clear that an appropriate definition should address the need for clear boundaries, broad applicability, inclusiveness, and monitoring efficiency. In order to achieve these goals, EPA developed the following definition of an electric power system facility:

> [an electric power system is comprised of] all electric transmission and distribution equipment insulated with or containing SF_6 or PFCs that is linked through electric power transmission or distribution lines and functions as an integrated unit, that is owned, serviced, or maintained by a single electric power transmission or distribution entity (or multiple entities with a common owner), and that is located between: (1) the point(s) at which electric energy is obtained from an electricity generating unit or a different electric power transmission or distribution entity that does not have a common owner, and (2) the point(s) at which any customer or another electric power transmission or distribution entity that does not have a common owner receives the electric energy. The facility also includes servicing inventory for such equipment that contains SF_6 or PFCs.

In this facility definition, the term "electric power transmission or distribution entity" is introduced. To maintain clarity, EPA developed a separate definition of "electric power transmission or distribution entity" largely based on the EIA definition shown in Table 1. The definition provided for "electric power transmission or distribution entity" is as follows.

any entity that transmits, distributes, or supplies electricity to a consumer or other user, including any company, electric cooperative, public electric supply corporation, a similar Federal department (including the Bureau of Reclamation or the Corps of Engineers), a municipally owned electric department offering service to the public, an electric public utility district, or a jointly owned electric supply project.

2. Options for Reporting Threshold

EPA evaluated a range of threshold options for electric power systems. These included emission threshold options of 1,000, 10,000, 25,000, and 100,000 metric tons CO_2e, and nameplate capacity thresholds equivalent to these (713; 7,128; 17, 820; and 71,280 lbs of SF_6). These equivalencies were developed using historical (1999) data from utilities that participate in EPA's SF_6 Emission Reduction Partnership for Electric Power Systems (Partnership). To determine the nameplate capacity threshold level, the emissions threshold was converted to pounds of SF_6 and divided by the 1999 weighted average annual leak rate (as a fraction of nameplate capacity) of the Partnership. This leak rate was developed by dividing the 1999 SF_6 emissions reported by 42 partner utilities by the nameplate capacity reported by these partners.[2] Partners with extraordinarily high or low leak rates (outliers) were excluded from the analysis. The Partners included in the analysis represented approximately 24 percent of U.S. transmission miles in 2000.

Based on information from the Partnership and from the UDI database, EPA estimates that the 17,820 lbs of SF_6 nameplate capacity threshold covers only a small percentage (10 percent or 141 utilities) of total utilities, while covering the majority (approximately 83 percent) of annual emissions.

A capacity-based threshold permits sources to quickly determine whether they are covered. There have been many mergers and acquisitions in the electric power industry, which could complicate efforts to estimate recent emissions. In contrast, nameplate capacity is generally a known variable. A summary of these threshold options, the total national SF_6 emissions, the total number of facilities, and the number of facilities and emissions falling above each threshold is presented in Table 2.

[2] EPA used 1999 weighted leak rates under the assumption that utilities who have not participated in the Partnership activities have not achieved the emission reductions from 1999-2008 that have been achieved by Partners who have taken voluntary actions to reduce emissions, In addition, it was essential that a non-emissions based threshold be conservative enough to ensure that sources emitting more than 25,000 metric tons of CO_2 equivalent were covered by the threshold.

Table 2: Options for Emissions and Capacity-Based Thresholds for Electric Power Systems

Emission Threshold Level ($mtCO_2e$)	Total National SF_6 Emissions (million mtCO2e)	Total Number of Facilities	Emissions Covered		Facilities Covered	
			Million $mtCO_2e$	Percent	Facilities	Percent
1,000	12.4	1364	12.2	98.3	564	41.3
10,000	12.4	1364	10.87	87.6	158	11.6
25,000	12.4	1364	10.11	81.5	111	8.1
100,000	12.4	1364	5.84	47.1	27	2
Nameplate Capacity Threshold (lbs SF_6)						
713	12.4	1364	12.19	98.3	578	42.4
7,128	12.4	1364	10.96	88.3	183	13.4
17,820	12.4	1364	10.32	83.2	141	10.3
71,280	12.4	1364	5.95	48.0	35	2.6
Transmission-Mile Threshold (miles)						
47	12.4	1364	12.20	98.3	584	42.8
475	12.4	1364	10.86	87.5	186	13.6
1,186	12.4	1364	8.74	70.4	140	10.3
4,745	12.4	1364	4.53	36.5	34	2.5

EPA also evaluated a threshold based on the length of the transmission lines, defined as the miles of lines carrying voltages above 34.5 kV, owned by electric power systems. Like the nameplate capacity threshold, the transmission mile threshold was developed by dividing the emissions threshold by an emission factor, this one expressing emissions in terms of transmission miles. The emission factor was developed using the 1999 SF_6 emissions reported by 43 partner utilities (representing approximately 24 percent of U.S. transmission miles in 2000), and 2000 transmission mileage data obtained from the 2001 UDI Directory of Electric Power Producers and Distributors (UDI 2001). The transmission-mile threshold equivalent to 25,000 $mtCO_2e$ is 1,186 miles.

The relationship between emissions and transmission miles, while strong, is not as strong as that between emissions and nameplate capacity. On the one hand, some utilities have far larger nameplate capacities and emissions than would be expected based on their transmission miles. This is the case for some urban utilities that have large volumes of SF_6 in gas-insulated switchgear (GIS). On the other hand, some utilities have lower nameplate capacities and emissions than would be expected based on their transmission miles, because most of their transmission lines use lower voltages and typically use less SF_6.

a. Equipment under common ownership and control located outside the facility

EPA considered that the definition of the electric power system facility could under certain circumstances result in a company dividing its assets into more than one facility that each fall below the threshold. For example, if a company owns two electric power systems as subsidiary companies and each subsidiary company owns and operates collections of SF_6 insulated equipment that are in the same geographic vicinity but not electrically connected, then the two collections of equipment [owned by the subsidiary companies] would be considered separate reporting facilities. EPA considered whether or not in situations where the nameplate capacities for each of the subsidiary companies were below the reporting threshold of 17,820 pounds, these facilities would be required to report emissions if their combined nameplate capacities were above 17,820 pounds.

Given that the purpose of the reporting threshold is to capture the largest quantity of emissions while minimizing the burden to industry, allowing subsidiary companies in the example mentioned above to avoid reporting emissions when their *combined* nameplate capacities would fall above the threshold would be counter to the purpose of the threshold. Monitoring equipment such as cylinder scales, as well as recordkeeping technologies and procedures, are often shared among subsidiary companies to reduce the overall expense to the parent company. If numerous subsidiary companies with a single parent company are all separated as distinct facilities (because they are not connected electrically), then each could fall below the reporting threshold resulting in significant emissions going unreported to EPA even though much of the reporting burden could be shared among the subsidiary companies or absorbed by the parent company.

To avoid this situation, it is necessary that electric power system facilities add their nameplate capacities to the nameplate capacities of other electric power transmission or distribution facilities with a common owner when determining whether they fall above or below the 17,820 pound nameplate capacity threshold. If facilities with a common owner collectively fall above the reporting threshold, then the emissions for each distinct facility must still be monitored and reported separately to EPA.

b. Reporting emissions from SF_6 and PFC insulated equipment located at electricity generating units (EGUs)

Electricity generating units (EGUs) that report under Subpart D of the Mandatory Reporting Rule often contain relatively small amounts of SF_6 and PFC insulated equipment. Under subpart A general provisions, EGU facilities that are required to report subpart D emissions must also report other source category emissions that occur at the facility location, including subpart DD emissions.

In some cases, calculating emissions from SF_6 and PFC insulated equipment located at EGU sites would be straightforward. However, in other cases where integrated utilities operate generation facilities as well as electrical equipment that transmits and distributes electricity from the generation facilities, it could be difficult to estimate emissions from equipment at the EGU sites separately from equipment outside of the EGU sites that are serviced by the same centralized SF_6 stocks. Furthermore, there is a risk of double-counting emissions if EGUs include subpart DD emissions in their subpart D facility emission reports since those emissions might also be included in subpart DD electric power transmission or distribution facility reports. Since there are generally small amounts of SF_6 and PFC insulated equipment located at EGUs relative to electric power transmission or distribution systems, the benefit of reporting emissions from equipment located at EGUs usually does not outweigh the potential issues cited above. The exception would be if there was a large amount of SF_6 or PFC insulated equipment located at the EGU that could result in a large amount of emissions. Therefore, the final rule specifies that EGUs only need to include subpart DD emissions in their facility reports if the amount of SF_6 or PFC containing equipment located within the subpart D facility exceeds a threshold of 17,820 pounds of nameplate capacity, which is the same reporting threshold applied to subpart DD electric power transmission or distribution system facilities.

3. Options for Monitoring Methods

EPA reviewed the *2006 IPCC Guidelines*, the SF_6 Emission Reduction Partnership for Electric Power Systems, the *Inventory of U.S. Greenhouse Gas Emissions and Sinks*, the Technical Guidelines for the Voluntary Reporting of Greenhouse Gases (1605(b)) Program, EPA's Climate Leaders Program, and The Climate Registry for this analysis.

These methods coalesce around the three options presented in the 2006 IPCC Guidelines. These include a Tier 1 approach that estimates emissions by multiplying equipment nameplate capacity by default emission factors, a Tier 2 approach that estimates emissions by multiplying equipment nameplate capacity by national emission factors, and a Tier 3 mass-balance approach that estimates emissions based on facility-specific data on SF_6 consumption and nameplate capacity changes.

Although the Tier 1 method is simple, the default emission factors have large uncertainty due to variability associated with handling and management practices, age of equipment, mix of equipment, and other similar factors. Utilities participating in EPA's Partnership have reduced their emission factors to less than the Tier 1 default values. Less than 10 percent of U.S. utilities participate in this program, however, these utilities represent over 40% of the transmission miles in the U.S.

Tier 2 methods use country-specific emission factors, but the Partner utilities have demonstrated through calculating their own utility-level emission factors that there is large variability (less than one percent to greater than 35%) in utility-level emission factors across the nation.

The Tier 3 approach is a utility-level mass-balance approach. This method is the approach used in EPA's SF_6 Emission Reduction Partnership for Electric Power Systems. The mass-balance approach works by tracking and systematically accounting for all utility uses of SF_6 during the reporting year. The quantity of SF_6 that cannot be accounted for is assumed to have been emitted to the atmosphere.

The following equation describes the mass-balance approach.

User Emissions = Decrease in SF_6 Inventory + Acquisitions of SF_6 – Disbursements of SF_6 – Net Increase in Total Nameplate Capacity of Equipment

where,

Decrease in SF_6 Inventory is SF_6 stored in containers (but not in equipment) at the beginning of the year – SF_6 stored in containers (but not in equipment) at the end of the year.

Acquisitions of SF_6 is SF_6 purchased from chemical producers or distributors in bulk + SF_6 purchased from equipment manufacturers or distributors with or inside of equipment + SF_6 returned to site after off-site recycling.

Disbursements of SF_6 is SF_6 in bulk and contained in equipment that is sold to other entities + SF_6 returned to suppliers + SF_6 sent off-site for recycling + SF_6 sent to destruction facilities.

Net Increase in Total Nameplate Capacity of Equipment is the nameplate capacity of new equipment – nameplate capacity of retiring equipment. (Note that nameplate capacity refers to the full and proper charge of equipment rather than to the actual charge, which may reflect leakage.)

This method can also be applied to emissions of PFCs from power transformers.

4. Procedures for Estimating Missing Data

To be accurate, the mass-balance approach requires measured values for all inputs. Partner utilities missing inputs to the mass-balance approach have estimated emissions using other methods, such as assuming that all purchased SF_6 is emitted. However, this method over-estimates emissions. Should the utility be missing records for a given input, it may be possible that the gas or equipment supplier has information in their records for the utility. Alternatively, values from previous years could be applied to the current year, but this approach introduces large uncertainties because emission rates vary from year to year.

5. QA/QC Requirements

QA/QC methods for reviewing completeness and accuracy of reporting include the following.

- Review inputs to the mass balance equation to ensure inputs and outputs to the facility's system are all accounted for in all appropriate sections.
- Ensure no negative inputs are entered and negative emissions are not calculated. However, the *change* in storage inventory and nameplate capacity may be calculated as negative numbers.
- Ensure that beginning of year inventory matches end of year inventory from previous year.
- Ensure that in addition to SF_6 purchased from bulk gas distributors, SF_6 purchased from Original Equipment Manufacturers (OEM) and SF_6 returned to the facility from off-site recycling are also accounted for among the total additions.

QA/QC methods should be employed throughout the year. Important checks/procedures include the following.

- Ensure that cylinders returned to the vendor are weighed in a consistent manner on a scale that is certified to be accurate and precise to within 2 pounds of true weight and is periodically recalibrated per the manufacturer's specifications.
    - Gas suppliers measure the amount of gas remaining in cylinders/tanks returned (residual gas).

- Gas suppliers can provide a detailed monthly spreadsheet with exact residual gas amounts returned.

- Ensure all substations have provided information to the person responsible for compiling the emissions report (if it is not already handled through an electronic inventory system).

a. Analysis to determine scale accuracy requirements

A ±1 percent relative accuracy requirement for scales was originally proposed; however, based on comments EPA received during the public comment period indicating that the proposed requirement was too stringent, EPA reassessed the appropriate level of accuracy and precision for scales used to weigh cylinders.

The first steps undertaken by EPA to reassess scale accuracy requirements were to research scale manufacturer Web sites and to contact scale manufacturers and electrical equipment users to better understand what scales are available on the market and the typical specifications of scales designed to weigh cylinders.[3]

Additional discussion with industry occurred at EPA's SF_6 Partnership for Electric Power Systems Partner Meeting, from May 13-14, 2010, where Partners discussed what types of scales they currently use, the price of various types of scales, and recommendations on scale accuracy requirements. The recommendations varied among Partners, with some Partners recommending relative accuracy requirements in the ± 3-5% range and at least one Partner recommending an absolute accuracy requirement of ± 2 pounds of true weight (EPA Partner Meeting, 2010), EPA also contacted two representatives from the Partnership in follow up to these conversations (BPA, 2010; Oncor, 2010).

After consulting directly with industry and reviewing public comments, EPA performed a sensitivity analysis using a variety of scale accuracies to analyze what effect changes in scale accuracies would have on the relative uncertainty of emission estimates. The analysis was performed using 2008 reported data from four various sized Partners of EPA's SF_6 Emission Reduction Partnership for Electric Power Systems. Since the price of scales tends to increase as scale accuracy increases (all else being equal), EPA's goal was to determine which scale accuracy requirement would result in the least cost burden while still providing emission estimates with reasonable uncertainty levels. The summary results from the sensitivity analysis are provided in Table 3 below.[4]

Table 3: Relative Uncertainties of Emission Estimates for Various Scale Accuracies (95% Confidence Interval)

Level of accuracy applied to mass-balance inputs[a]	Partner 1	Partner 2	Partner 3	Partner 4	Average
± 1% (relative)	2.6%	4.1%	0.5%	2.6%	2.5%
± 5% (relative)	9.8%	6.5%	2.6%	2.8%	5.4%
± 1 pound (absolute)	2.5%	4.1%	0.5%	2.6%	2.4%
± 2 pound (absolute)	4.1%	4.4%	1%	2.6%	3%
± 1% of full scale (absolute)[b]	6.5%	5%	1.7%	2.6%	4%

[a] The level of accuracy was applied to all inputs except for new and retiring nameplate capacities, which are not measured using scales and were assumed to have 2% relative uncertainty. Calculations also were performed using relative uncertainties of 1% and 5% for new and retiring nameplate capacities; the entire analysis and corresponding results can be found in the public docket (Docket ID No. EPA-HQ-OAR-2009-0927).
[b] Assuming full scale is equivalent to a scale capacity of 330 pounds.

After reviewing the results of the sensitivity analysis as well as public comments submitted by electrical equipment users, EPA determined that a ±2 pound absolute accuracy requirement offered the best balance between the accuracy of emission estimates and the burden incurred by electric power system facilities. Therefore, the final rule requires scales to be accurate within ±2 pounds of true weight. This absolute accuracy requirement is less stringent than the ±1 percent relative accuracy requirement that was originally proposed. Scales with accuracy less than ±2 pounds absolute were associated with emission estimate uncertainties of greater than 5%, which is too high for yielding data

3 Documentation of the internet research and correspondence with scale manufacturers can be found in the docket for this rule (Docket ID No. EPA-HQ-OAR-2009-0927).

4 The analysis in its entirety is provided in the docket for this rule (Docket ID No. EPA-HQ-OAR-2009-0927).

that is useful to policymaking. In addition, numerous commenters recommended an absolute scale accuracy requirement of ±2 pounds as a way to reduce the financial burden to equipment users.[5]

6. Reporting Procedures

The following supplemental data would be useful for confirming emissions calculations and/or calculating emission rates that could be compared across facilities for quality control purposes:

- Nameplate capacity:
  - Existing at the beginning of the year.
  - New during the year.
  - Retired during the year.
- Transmission miles (length of lines carrying voltages above 35 kV).
- Distribution miles (length of lines carrying voltages at or below 35 kV).
- SF_6 and PFC stored in containers, but not in energized equipment, at the beginning of the year.
- SF_6 and PFC stored in containers, but not in energized equipment, at the end of the year.
- SF_6 and PFC purchased in bulk from chemical producers or distributors
- SF_6 and PFC purchased from equipment manufacturers or distributors with or inside equipment
- SF_6 and PFC returned to facility after off-site recycling.
- SF_6 and PFC in bulk and contained in equipment sold to other entities.
- SF_6 and PFC returned to suppliers.
- SF_6 and PFC sent off-site for recycling.
- SF_6 and PFC sent off-site for destruction.

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[5] For a summary of public comments relating to scale accuracy, see the response-to-comment document for subpart DD in the docket for this rule (Docket ID No. EPA-HQ-OAR-2009-0927).

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