

# **APPENDIX B**

Summary of Survey Results

and

Sample Survey Questionnaire

## **Summary of Survey Results/Sample Survey Questionnaire**

On January 13, 2009, ARB staff issued a survey questionnaire to entities on ARB's list serve for the proposed SF<sub>6</sub> emission reduction measure for gas insulated switchgear (GIS). These entities included all California and out-of-state utilities and electrical generators which own GIS within the state. The survey was also sent to particle accelerators, universities, laboratories, and businesses which generate electricity for their own on-site use and which also own GIS used to distribute their electricity.

Staff requested information on the various elements of California's GIS equipment inventory including type and age of gear, SF<sub>6</sub> capacity and current emission reduction programs. Staff received survey responses from 23 entities: five investor-owned utilities, nine publically-owned utilities, six cogenerators, two power producers, and one particle accelerator. The responding utilities serve over 95 percent of California's electrical load.

Survey responses, coupled with actual SF<sub>6</sub> emissions data received from entities responding to ARB's mandatory reporting regulations, indicate that current sulfur hexafluoride emission rates range from 0.04 percent to 11 percent. The average emission rate for respondents is 7 percent.

Staff requested information on the age of gas insulated switchgear to determine the future potential for emission reductions based on retirement of aging equipment. New equipment requires less SF<sub>6</sub>, has improved seals and much less leakage potential. Of those entities responding to the survey, the average age of current gas insulated equipment is 10 years. The majority (67 percent) falls within the one to ten-year range. The life span of most GIS is 40 years. Ten percent of the California inventory is 30 years old or older and so is expected to be retired prior to 2020.

**CALIFORNIA ELECTRICITY SECTOR AND PARTICLE ACCELERATOR  
SULFUR HEXAFLUORIDE (SF<sub>6</sub>) SURVEY**

**General Information Requested from All Participants:**

**Company Name:** \_\_\_\_\_  
**Parent Company Name, if Applicable:** \_\_\_\_\_  
**Company Address:** \_\_\_\_\_  
**Contact Person:** \_\_\_\_\_  
**Job Title:** \_\_\_\_\_  
**Phone Number:** \_\_\_\_\_  
**e-mail Address:** \_\_\_\_\_  
**Webpage Address:** \_\_\_\_\_

**Information Requested from Particle Accelerator Operators:**

**Is this information confidential? Yes \_\_\_ No \_\_\_**

1. As a particle accelerator operator, are you responsible for electricity transmission or distribution equipment (circuit breakers, current-interruption equipment, transmission lines, transformers, substations, etc.)? If "yes":
  - a. Does any of the equipment use sulfur hexafluoride (SF<sub>6</sub>)? Yes\_\_\_ No\_\_\_
2. Do you use SF<sub>6</sub> for any purpose other than as a dielectric medium for electricity transmission or distribution equipment? If yes, please describe these purposes.

**[NOTE:** If your answers to Questions 1 and 2 above are "yes" please respond to Questions 4 and 6 through 18, inclusive, below. If your answers to Questions 1 and 2 are "no" please sign, date and return this survey questionnaire as specified in the cover letter.]

**CALIFORNIA ELECTRICITY SECTOR AND PARTICLE ACCELERATOR  
SULFUR HEXAFLUORIDE (SF<sub>6</sub>) SURVEY**

**Information Requested from Electricity Service Providers:**

**Is this information confidential? Yes \_\_\_ No \_\_\_**

**General**

3. As an electricity service provider, does your company own, or is it directly responsible for the maintenance of, electrical transmission and distribution equipment in California (circuit breakers, current-interruption equipment, transmission lines, transformers, substations)? If "yes":
- a. Does any of the equipment use sulfur hexafluoride (SF<sub>6</sub>)? Yes\_\_\_ No\_\_\_

**[NOTE:** If your answer to Question 3 is "yes" please respond to questions 4 through 18, below. If your answer is "no," please sign, date and return this survey questionnaire as specified in the cover letter.]

4. Does your company have an SF<sub>6</sub> emission reduction program? If "yes" please describe your program (attach extra sheets as needed).
5. Does your company participate in the U.S. EPA's SF<sub>6</sub> Emission Reduction Partnership for Electric Power Systems? Yes \_\_\_ No \_\_\_

**Cost and Quantity**

**Is this information confidential? Yes \_\_\_ No \_\_\_**

6. What were your estimated SF<sub>6</sub> emissions (in kilograms) each year for the years 2006, 2007, and 2008? Please see Attachment A for emission reduction calculation methodology.

<b>Year</b>	<b>SF<sub>6</sub> Emissions (in kilograms)</b>
<b>2006</b>	
<b>2007</b>	
<b>2008</b>	

7. What is the current price you pay for sulfur hexafluoride (US\$/kg.)? \_\_\_\_\_

**CALIFORNIA ELECTRICITY SECTOR AND PARTICLE ACCELERATOR  
SULFUR HEXAFLUORIDE (SF<sub>6</sub>) SURVEY**

**Equipment**

**Is this information confidential? Yes \_\_\_ No \_\_\_**

8. Please complete the table below **for each piece** of electrical transmission and distribution equipment which uses SF<sub>6</sub>. [Note: the table will expand to accommodate the total number of entries made.]

Identification Number *	Equipment Type	Voltage	Age	Seal Technology	Service Frequency	Date Last Serviced	Charge (in lbs.)

\*If the equipment does not have an identification number, please sequentially list each piece of equipment.

**Equipment Servicing Procedures**

**Is this information confidential? Yes \_\_\_ No \_\_\_**

9. Please describe your company's current servicing procedures (attach extra sheets as needed).

**Equipment Replacement/Transmission and Distribution Equipment Expansion**

**Is this information confidential? Yes \_\_\_ No \_\_\_**

10. Does your company have a plan to upgrade its current SF<sub>6</sub>-containing equipment? If "yes," please describe your plan and its time line (attach extra sheets as needed).
11. Does your company plan to expand its transmission and distribution network? If "yes":
- Please describe your plan and its time line (attach extra sheets as needed).
  - Please estimate any anticipated increase in use of SF<sub>6</sub>.

**CALIFORNIA ELECTRICITY SECTOR AND PARTICLE ACCELERATOR  
SULFUR HEXAFLUORIDE (SF<sub>6</sub>) SURVEY**

**Handling Procedures**

**Is this information confidential? Yes \_\_\_ No \_\_\_**

12. Please describe your company's current SF<sub>6</sub> transfer procedures (attach extra sheets as needed).

**Recycling**

**Is this information confidential? Yes \_\_\_ No \_\_\_**

13. Does your company have a recycling program for SF<sub>6</sub>? If "yes" please describe your current recycling practices and their costs on a dollars-per-pound of SF<sub>6</sub> basis (attach extra sheets as needed).
14. If your answer to Question 13 is "no":
- a. Why do you not recycle? (Attach extra sheets as needed.)
  - b. What is done with the SF<sub>6</sub> remaining in decommissioned equipment? (Attach extra sheets as needed.)

**Leak Detection and Repair (LDAR)**

**Is this information confidential? Yes \_\_\_ No \_\_\_**

15. Does your company have an SF<sub>6</sub> leak detection and repair (LDAR) program? If "yes" please describe your company's program and its LDAR costs on a dollars-per-pound of SF<sub>6</sub> basis (attach extra sheets as needed).

**Optional Mediums/Equipment**

**Is this information confidential? Yes \_\_\_ No \_\_\_**

16. Does your company use other insulating gasses? If "yes:"
- a. What are the gasses?
  - b. Please describe their uses (attach extra sheets as needed).

**CALIFORNIA ELECTRICITY SECTOR AND PARTICLE ACCELERATOR  
SULFUR HEXAFLUORIDE (SF<sub>6</sub>) SURVEY**

- 17. Does your company use vacuum sealed equipment for electricity transmission and distribution? If "yes" please describe its use (attach extra sheets as needed).
  
- 18. Has your company researched using alternatives to SF<sub>6</sub> in the electricity sector and for use in particle accelerators? If "yes" please describe your findings (attach extra sheets as needed).

**Name and Title of Person Completing the Survey**

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<b>Name</b>	<b>Title</b>
Please type or print	

**Signature** \_\_\_\_\_

**Date** \_\_\_\_\_