

B O N N E V I L L E
P O W E R A D M I N I S T R A T I O N



SULFUR HEXAFLUORIDE (SF₆) GAS EMISSIONS REDUCTION PARTNERSHIP WITH EPA

By: Joseph Lo

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BPA Is a Charter Partner of EPA

- **Recognizes SF₆ as a “Greenhouse gas”**
- **SF₆ is an important insulating & extinguishing gas in high voltage equipment**
- **Wants to be on the forefront of environmental issues**
- **On April 1, 1999, BPA signed the Memorandum of Understanding (MOU)**

Exception to MOU

- **Made exception to EPA inventory protocol (attachment B)**
 - **Not a direct emission measurement**
 - **Difficult to account for gas bottles (residual gas) in over 300 substations**
 - **Gas capacity on equipment nameplate may not be precise**
 - **The gas carts are not DOT approved and cannot be transported to weigh station**

Exception to MOU

- **BPA prefers making direct measurement on gas added to HV equipment**
 - **By weighing the gas bottle on a floor scale before and after filling**
 - **Record and report the precise emissions**

Benefits of Making Direct Measurement

- **Provides valuable maintenance information**
- **Identifies the leaking equipment**
- **Prioritizes equipment repair or replacement**

Annual Report to EPA

- The total amount of SF₆ contained in high voltage equipment in service
- The amount (lbs.) of SF₆ gas added to return high voltage equipment to normal pressure
- The average leakage rate over the past year
- The cumulative average leakage rate over the total period since the MOU was signed
- A list of SF₆ equipment replaced

BPA SF₆ Equipment and Leak Status for Year 1999

- SF₆ gas filling on leaking equipment = 3,737 lbs.
- SF₆ in operating breakers = 191,768 lbs.
- SF₆ in operating high speed ground switches = 534 lbs.
- SF₆ in operating current transformers = 49,034 lbs.
- SF₆ in GIS equipment = 176,489 lbs.
- BPA leak rate for year 1999 is 0.89%

BPA Policies

- **BPA will record the amount of SF₆ leaked**
- **All SF₆ handlers are required to take BPA's "SF₆ GAS HANDLING" course or be trained by coworker**
- **Used SF₆ gas shall be recycled**
- **Will prevent releasing of SF₆ gas or faulted SF₆ gas**

BPA Policies

- **SF₆ gas losses from electrical equipment are to be reduced by:**
 - Improved equipment design
 - Timely intervention by electricians to repair gas leaks
 - Developing improved gas handling techniques
- **Annual SF₆ emissions report will be submitted to the EPA**

BPA Transmission System

- **15,000 miles of power lines**
- **357 substations in the Northwest**
- **Over 700 SF₆ insulated breakers**
- **Longer travel for maintenance crew**

Replacement Principles for Better Reliable System

- **Aggressive program to replace most old SF₆ breakers by year 2006**
- **Leakage is a factor for replacement**
- **Minimum crew size requires more reliable equipment**
- **Unreliable breakers cost major revenue lost**
- **Leasing state-of-the-art laser imaging camera for leak detection**

Conclusion

- **SF₆ is a vital insulating medium**
- **\$5 million spent to replace 12 older SF₆ breakers (leakers)**
- **BPA specifying a maximum leakage rate of 0.5%**
- **BPA is “Greenhouse gas” conscious agency!**