California Environmental Protection Agency
AIR RESOURCES BOARD

Proposed Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear

California Air Resources Board

February 25, 2010

Overview

- Background
- Proposed Regulation
  - Environmental Impacts
  - Estimated Costs
  - Economic Impacts
- Proposed 15-Day Changes
- Staff Recommendation

BACKGROUND

Sulfur Hexaflouride (SF_6)

- Sulfur hexafluoride (SF_6) is a potent greenhouse gas
- The Scoping Plan identifies three SF_6 reduction measures
  - Non-electric and non-semiconductor applications (effective 1/1/2010)
  - Semiconductor operations (effective 1/1/2010)
  - Electricity sector (today's proposal)

SF_6 in Electrical Equipment

- SF_6 is used extensively in gas insulated switchgear (GIS)
- Including:
  - Gas-insulated substations
  - Circuit breakers
  - Electrical transformers
  - Gas insulated transmission lines
- No current substitute in HV equipment

Photo credit: California Energy Commission

PROPOSED REGULATION

Affected Entities

- Approximately 75 affected entities
  - Investor-owned utilities
  - Publically-owned utilities
  - Co-generating industries
  - Military
  - Universities
  - State government

Regulation Development and Public Outreach

- Survey
- Website and List Serve
- Technical Working Group
- Participation and Coordination with U.S. EPA
- Meetings and Tours
- Public Workshop

Key Elements of the Proposal

- Establishes an annual maximum emission rate
- Sets initial emission rate at 10% of nameplate capacity
- Requires GIS owners to reduce their SF_6 emission rate by 1% per year over a ten year period from 2011 to 2020
- Beginning in 2020, sets maximum emission rate not to exceed 1%

SF_6 Gas Management Techniques

- Reductions achieved by least cost gas management techniques
  - Leak Detection and Repair (LDAR)
  - SF_6 Recycling
  - Equipment Refurbishment
  - Equipment Replacement

Recordkeeping and Reporting Requirements

- Demonstrate compliance through recordkeeping and reporting requirements
- Annual reports would include:
  - SF_6 emissions
  - SF_6 emission rate
- GIS owners must have available upon ARB request:
  - Current SF_6 inventories
  - GIS SF_6 nameplate capacity

Environmental Impacts

- Decreases GHG emissions by an annual average 25,300 $MTCO_2e$
- Cumulatively reduce emissions by 253,000 $MTCO_2e$ over the ten year regulatory period
- Achieve 70% reduction from baseline by 2020

Estimated Costs and Cost Effectiveness

- Total cost over ten year regulatory period:
  - $4.5 to $7 million

- Cost effectiveness:
  - $18 to $28 per metric ton of carbon dioxide equivalent emissions reduced

Economic Impacts

- May result in minimally-increased electricity costs

- Costs may be absorbed or passed forward
  - 0.002% increase in utility bills
  - An average of one to two cents per residential customer per year

Enforcement

- Enforced by ARB
- Consistent with other regulations adopted pursuant to AB 32
- Ensures fair and appropriate penalties for violations while encouraging compliance

Proposed 15-Day Changes

- Delay first report from 2011 to 2012
- Revise “active equipment” definition to include connected and fully-charged backup GIS
- Revise “emergency event” definition to address all disasters
- Revise “emergency event” exemption to begin at onset of regulation

Staff Recommendation

- Approve staff's recommendation with proposed changes.