

Proposed AB 32 Discrete Early Action Regulation:

**Regulation for Reduction of Sulfur
Hexafluoride from Non-Utility and
Non-Semiconductor Manufacturing**

February 26, 2009

California Environmental Protection Agency

 **Air Resources Board**

Importance of Regulating SF₆

- SF₆ is the most potent greenhouse gas the IPCC has identified
- Increasing at 5% per year
- Many uses are emissive (capture and recycling not feasible)
- Lifetime of over 3,200 years

**1 lb of SF₆ is equivalent to:
10 metric tons of CO₂
Driving around the world once**

**1 oz of SF₆ is equivalent to:
1.5 barrels of oil**

Sulfur Hexafluoride Regulations

- Fluorinated gases in semiconductor manufacturing
- SF₆ in electric utilities
- This regulation: SF₆ in non-utility and non-semiconductor manufacturing

Emissions and Sources

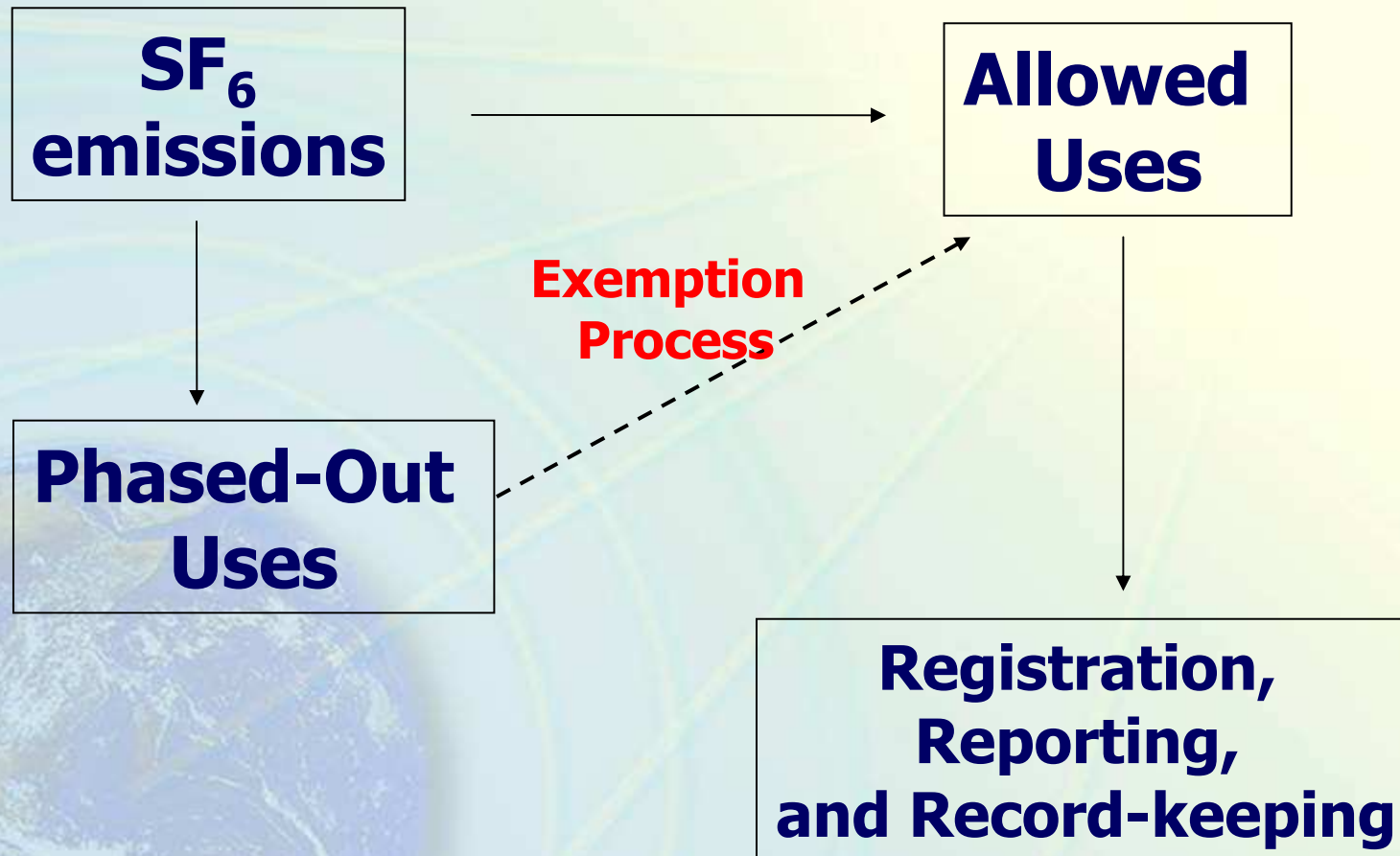
- **Tracer Gas Testing**
- **Magnesium Casting**
- **Other uses (military, research, consumer products, medical)**
- **Total emissions are 0.15 MMTCO₂E**

Proposed Regulation

Reduce emissions of SF₆ from non-semiconductor and non-electricity applications

- Staff evaluated broad spectrum of options
- Reduction of 0.1 MMTCO₂E annually
- Low Cost
- Blocks new uses
- Could serve as model for other states

Components of Regulation



Phase-Out Dates

Applications	Phase-Out Dates
All uses except those listed below*	January 1, 2011
Tracer Gas Testing	January 1, 2013
Magnesium Sand Casting	
Magnesium Investment Casting	
Military Applications	

***This regulation does not apply to semiconductor manufacturing or electric utilities as separate focused regulations will address these source categories**

Tracer Gas Testing

- Uses includes:
 - Atmospheric transport
 - Characterization of ventilation systems
 - Air infiltration studies
 - Leak testing
 - Characterizing flow patterns
 - Other uses including for military purposes
- Alternatives
- Status

Tracer Gas Testing – Fume Hoods

- Cal/OSHA and ASHRAE 110 standard required for energy saving setback technology (**allowed use due to GHG reductions**)
- Testing fume hoods with SF₆ outside of Cal/OSHA regulation (**not allowed**)

1 fume hood test = ~40,000 miles driven



Tracer Gas Testing

Magnesium Casting

- SF_6 used to prevent oxidation during magnesium casting
- Timing allows for testing results and re-certification of methods
- Alternatives
- Status



Magnesium Casting

Other Uses

To be Phased Out:

- Consumer product, military and research
- Any future use

To be Exempted

- Medical Uses
 - Only 4 pounds of SF₆ used per year (0.00004 MMTCO₂E)
 - Potential alternatives not considered as effective
- Research for concentration measurements, on health impacts, or on alternatives to SF₆
- Other uses will be judged on a case-by-case basis in exemption process

Exemption Process

- One of two criteria for an exemption:
 - Uses that result in reduced GHG emissions
 - Uses with no alternatives
- Flexible enough to allow variety of applications
- Applications must include mitigation plan

Registration, Record keeping and Reporting

- Distributors (<30 firms)
 - Register
 - Keep records of sales for 3 years
 - Provide an annual report of each sale (quantity and date)
- Purchasers (40-70 users)
 - Keep records of annual quantity of SF₆ purchased and used

Environmental & Economic Impacts

- Emission reduction = 0.10 MMTCO₂E per year
- Cost-effectiveness = ~\$2 per MTCO₂E
- Total cost is \$200,000 a year over 20 years
 - Costs borne by both industry and their clients
 - General public not greatly impacted
- Other states may adopt the regulation
- Can be harmonized with a high GWP mitigation fee in the future

Regulatory Development Process

- 3 public workshops
- 2 workgroup meetings and 2 sub-workgroup meetings
- Outreach
 - Government agencies
 - Industry
 - Academia
- ISOR posted on 1/8/2009
- Comments

Conclusion & Recommendation

- Reduces GHG emissions
- Attainable with existing technology
- Cost-effective
- **STAFF RECOMMENDS BOARD ADOPTION**