Benefits of Established Industrial Partnerships

*PFC Emissions Reduction Partnership for the Semiconductor Industry*

Chuck Fraust
Director, Environment, Health and Safety
San Diego, CA
Outline

- Background Information
- Current Voluntary Agreement (MOU)
- Outgrowths of Voluntary Agreement
- World Semiconductor Council (WSC)
- WSC ESH Task Force
- Current Status
- Benefits
Background Information

- Semiconductor Manufacturing
- Experience with CFC Elimination
- Chemical Suppliers
- Traditional Command and Control Approach
Voluntary Agreement

◆ Common Agreements and Principles
◆ Company Responsibilities
◆ EPA Responsibilities
Common Agreements and Principles

- Voluntary
- Between Individual Companies and EPA
- Recognition That PFCs Were Critical to Industry
- Recognition That Suitable Substitutes Had Not Been Identified
- Covered 6 Gases, CF₄, C₂F₆, C₃F₈, CHF₃, NF₃, and SF₆
- Commitment to Work Together to Reduce PFC Emissions
- Identification of Industry as Highly Competitive and Global
Company Responsibilities

◆ Prepare Annual Emissions Estimate
  ● Overall absolute PFC emissions
  ● Normalized PFC emissions
  ● Written methodology

◆ Designation of Third Party to Collect, Aggregate, and Disseminate Information

◆ Commitment to Reduce Normalized PFC Emissions Following Pollution Prevention Hierarchy

◆ Share Information with EPA and Others
EPA Responsibilities

- Serve as Information Clearinghouse
- Provide Recognition for Participating Companies
- Seek Similar Commitments from All US Semiconductor Manufacturers
- Encourage Governments of Countries with Semiconductor Operations to Seek Similar Commitments
- Conduct Preliminary Assessments of Potential Substitute Chemicals
Impact of Voluntary Agreement

- Geo-Political
- Technological
Geo-Political Impact

- Discussions Between EPA and MITI (Ministry of International Trade and Industry)

- Establishment of World Semiconductor Council (WSC)

- Establishment of the WSC ESH Task Force
World Semiconductor Council

◆ Members
  - SIA  Semiconductor Industry Association (US)
  - EIAJ  Electronics Industry Association of Japan
  - EECA  European Electronic Components Manufacturers Association
  - KSIA  Korean Semiconductor Industry Association
  - TSIA  Taiwan Semiconductor Industry

◆ Mission: to Lower Trade Barriers Through Cooperative Programs

◆ Environment, Safety, and Health
  - Well suited for cooperative programs
  - PFCs uniquely appropriate
  - ESH Task Force
WSC ESH Task Force Accomplishments

- Sharing of Information
- Engaging Tool and Chemical Suppliers
- Establishing Common Metrics and Measurement Methodologies
- Created and Instituted Global PFC Emission Reduction Goal
  - Reduce absolute PFC emissions to at least 10% below baseline
  - Industry association goal, not individual company goal
Reduction Strategy

- 16% Growth
- 1995 Base
- 10% Below Base
- Actual
Technological Advances

- New Processes
- New Chemistries
- New Abatement Devices
Research Centers

✦ United States
  - International SEMATECH
  - NSF/SRC Engineering Research Center for Benign Semiconductor Manufacturing (ERC)

✦ Japan
  - ASET
  - RITE

✦ Europe
  - IMEC

✦ Taiwan
  - ITRI

✦ Korea
  - Semiconductor Clean Technology Center
Current Status

◆ International
  ● Global PFC emission reduction program underway
  ● Each association has agreed to a base year and base emission
  ● WSC ESH Task Force working on guidelines for voluntary action plans based on consensus emissions reduction goal
  ● WSC ESH Task Force is evaluating additional EHS issues to work on

◆ United States
  ● Industry and EPA working on next MOU
  ● MOU will be partnership between EPA and SIA
  ● Consensus Emission Reduction Goal and IPCC guidelines will be basis for new MOU
  ● Much simpler process
Benefits

- Friendlier Process
- Cost Effective
- Encourages Innovative Solutions
- Faster Implementation
- Shared Responsibility
- Win-Win
- Led to Global Initiative
- Shared Technology Development

- More Rational Approach to Global Environmental Problems