Voluntary Efforts To Increase Refrigerator Foam Recovery

Energy Star Appliance Partner Meeting
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Proper Appliance Recycling Offers Important Environmental Benefits

- Raw materials can be recovered and recycled, saving energy and natural resources

- Older appliances can contain chemicals harmful to human health and the environment

- Majority of refrigerators made before 2003 contain ODS
2003 Ozone Hole- Second Largest Ever

A Healthy Ozone Layer Protects Human Health and the Environment

- A depleted ozone layer allows more UV light to reach the earth

- Overall, EPA’s ozone program will prevent:
  - 6.3 million skin cancer deaths
  - 300 million cases of non-fatal melanoma
  - 27.5 million cases of cataracts
  - Plant and marine life damage
Foam From Refrigerators Built before 1994 are Expected to Release CFCs

- CFCs in Refrigerators
  - Foam: CFC-11

- Disposed foam from 2005-2010 will contain 45,000 tonnes of CFC-11
  - = 57 MMTCE
Accelerated Retirement and “Best Practices”
Recycling of Old Refrigerators Saves Energy and GHG Emissions

Energy Savings

- Successful programs have reached 2%-10% of households
  - = 5,060-25,300 GWh, 0.9-4.2 MMTCE

Recovery and Destruction of Foam BA

- CFC-11 in disposed foam annually through 2008
  - =9,500 ODP tonnes/ 12 MMTCE

- 20%-40% emitted annually through 2008
  - =1,900-3,800 ODP tonnes/ 2.4-4.8 MMTCE
Foam Is the Greatest Preventable Source of GHG Emissions From a 1990, Non E-Star Refrigerator

- 900 kWh/y = 2.25 MTCE over 15 yrs
  - replace w/ E-Star 5 years early, save 0.4 MTCE
- Compressor loop: 0.2 kg CFC-12 = 0.6 MTCE
  - recovered
- Foam: 1 kg CFC-11 = 1.2 MTCE
  - eventually emitted
International Actions on Appliance Foam

- **European Commission:**
  - 2000 ODS must be recovered and destroyed

- **Japan:**
  - 2001 Manufacturers and retailers responsible for taking back old appliances and recycling them (can charge fee)
  - 2003 ODS must be recovered and destroyed

- **Technical and Economic Assessment Panel (TEAP):**
  - 2002 Report on Destruction Technologies lists capture and incineration as effective means of removing CFC from the waste stream
  - 2004 Task Force investigating end of life management of foam in appliances and buildings
3 Keys to Increasing Voluntary Foam Recovery in the US

- **Key Partners**
  - Utilities
  - Retailers
  - Manufacturers
  - Recyclers

- **Identify Necessary Infrastructure**
  - Foam pulverizers and incinerators
  - Railways/highways

- **Determine Regions of opportunity**
  - Systems Benefit Charges
  - State or local CO2 Cap & Trade/Offset rules
  - Large numbers of fossil fuel electricity generators
Existing Foam Recovery Operations in the US

- **Appliance Recycling Centers of America (ARCA) Inc**
  - Removes foam manually
  - Pulverization with blowing agent recovery

- **JACO Environmental**
  - Removes foam manually
  - Incinerates foam and BA above 850 C
EPA and AHAM are Working to Quantify the Emissions

- Evaluating HCFC-141b replacements, fate of disposed foam
  - Insulation Technical Advisory Committee (ITAC)
  - Board members include all major manufacturers, EPA participates

- Work to quantify emissions
  - Emissions tied closely to resultant foam particle size (2002)
  - Some portion of landfilled BA may be broken down by microbes (2003)
  - US state of the practice and actual shredding emissions (2005)
Let’s Work Together to Protect the Ozone Layer and Save Energy

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