



Mobile AC Climate Protection Partnership at the Crossroads

Stephen O. Andersen & Kristen Taddonio
Climate Protection Partnerships Division
US Environmental Protection Agency

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SAE 7th Alternate Refrigerant Systems Symposium





EPA Congratulates MACS

- Congratulations to the Mobile Air Conditioning Climate Protection Partnership and the Mobile Air Conditioning Community!



Mobile AC Bottom Line

- Mobile air conditioning greenhouse gas emissions can be dramatically reduced at substantial savings to car owners and with co-benefits for local air quality, employment, and balance of trade
- A voluntary global partnership is doing just that
- Policy makers, citizens, & car owners can help
- Now is the critical time for outreach



Make-or-Break Challenges

- Agree SAE-2727 Worldwide
- Accelerate Choice of Next Global Refrigerant
- Support B-Cool/Eco-Mac Test Standard
- Remove Barriers to Selected Refrigerants
- Facilitate System Standards, Regulatory Approval, Supply and Service Infrastructure, Training, and Public Education



Agree SAE-2727 Worldwide

- SAE scoring adjusted to reflect system emissions
- Compressor leak rate at high default value unless specifically tested for a lower leak rate
- Scores translated to grams/year for EC & CA
- 2007 I-MAC certificate at superior system score
 - Qualifies for I-MAC Bear Logo and Honor
- Continuing component and system testing for validation



B-Cool/Eco-Mac

- Raises the Bar on Life Cycle Environmental Performance
- Test Any Refrigerant System Using:
 - Designated Vehicle
 - Consensus Test Facility
 - Standardized Tests
 - Trusted Test Validation Team



EPA Public Service Announcement (PSA)

- Positive Message
- 1.2 Million Imprints
- Governments
Associations
Companies
NGOs

thank you
for putting the environment in the driver's seat.

AC Delco
ACC Climate Control
Aneupf
Alliance of Automobile
Manufacturers
Association of International
Automobile Manufacturers
Arkama
Audi
Australian Department of
Environment and Heritage
Australian Federated Chamber
of Automotive Industries
Australian Federation of Automotive
Parts Manufacturers
Australian Fluorocarbon Council
Australian Government Office
Automotive Aftermarket
Industry Association
Bahr
Bosch
BMW
California Air Resources Board
Caleonic/Kaseal
Centro Ricerche Fiat
Cofac Automotive
DaimlerChrysler
Dipoli Corporation
DENSO
DuPont Fluoroproducts
Eaton
Ecole des Mines de Paris
Edith Cowan University (Australia)
Environment Directorate General
of the European Commission
Four Seasons
Friends of the Earth
General Motors
Geodyear
Honda
Honeywell
Hutchinson FTS
Indian Institute of
Technology Delhi
INEOS Fluor
International Organization
of Standardization
Institute for Governance and
Sustainable Development
Isuzu
Japan Automobile
Manufacturers Association
Japan Fluorocarbon
Manufacturers Association
Japan Industrial Conference for
Ozone Layer and Climate Protection
Japan Ministry of Economy,
Trade and Industry
Japan Ministry of Environment
Johnson Controls
Kia/Kiaia
KMC Partners Europe
Mitsubishi Motors
Mobile Air Conditioning Society
Molins
Natural Resources Defense Council
Nestlé
Nissan
Parker Hannifin
Pind Dot
Pohjanmaa Reclaim Australia
Sancken
Snap-On Diagnostics
Society of Automotive
Engineers
Solvay Fluorochemicals
SPX-Floctral
Subaru
Skye International Holdings
Sun West
Toshiba Instruments
Toyota
Tracor Products
Trojan
TYD Geneva
University Laboratories
United Nations Environment
Program DITE
U.S. Department of Energy's National
Renewable Energy Laboratory
U.S. Army
University of Braunschweig (Germany)
University of Illinois
University of Maryland
Ultraviolett Systems
Valco
Vehicle Airconditioning
Specialists of Australia
Valeon Corporation
Volkswagen
Volvo Car Corporation
World Resources Institute
ZECEL-Waco

Congratulations to Mobile Air Conditioning Climate Protection Partners for helping us all drive a little cleaner. A growing team of corporate, government, and environmental leaders is working together to rapidly improve the energy efficiency of your vehicle air conditioning system by at least 30% and reduce refrigerant emissions by at least 50%. New vehicles with improved air conditioning will ultimately avoid millions of tons of greenhouse gas emissions each year. Join the cause. Visit our website at www.epa.gov/eped/maac and help put the environment in the driver's seat.



Get the Message Out

- Production & Layout by EPA
- Agreed Text and 'Tag Line'
- Issued at Every Milestone
 - SAE-2727
 - SAE/I-MAC System Service
 - B-Cool/Eco-Mac
 - First I-MAC 30/50 Production Vehicle System
 - First CO₂ Production Vehicle System



Progress on EPA 'SNAP' Review of CO₂ and HFC-152a Systems

Karen Thundiyil
Stratospheric Protection Division
US Environmental Protection Agency

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EPA SNAP Authority

- Under Clean Air Act of 1990, Section 612, the Significant New Alternatives Policy (SNAP) Program approves substitutes for ozone depleting substances--including refrigerants replacing HFC-134a, which replaced CFC-12
- Accepted alternatives are determined to reduce overall risk to the environment



Proposal to List Alternatives

- SNAP currently lists HFC-134a
- New rulemaking proposes to list CO₂ and HFC-152a with use conditions in new car A/C systems
- EPA does NOT require a switch to CO₂ or HFC-152a



HFC-152a Use Conditions

- Risk mitigation strategies shall prevent HFC-152a concentrations of 3.7% or above in any part of the free space for more than 15 seconds
- “Free space is defined as the space inside the passenger compartment excluding the space enclosed by the ducting in the HVAC module”

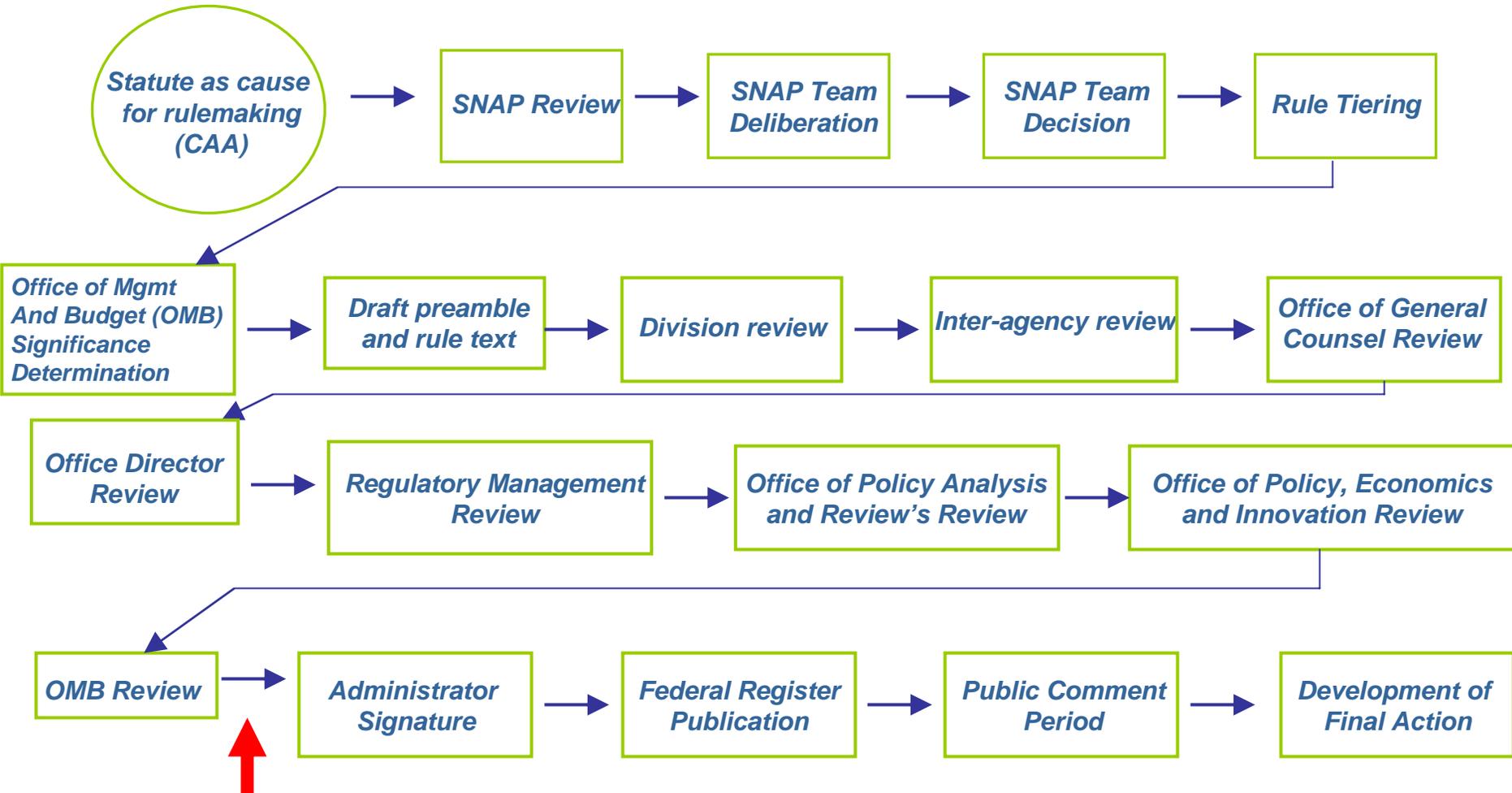


CO₂ Use Conditions

- **Risk mitigation strategies shall prevent free space concentrations greater than the CO₂ short-term exposure limit (STEL) of 3% averaged over 15 minutes**
 - The CO₂ STEL is a national standard defined by the American Conference of Governmental Industrial Hygienists (ACGIH) and consistent with the National Institute for Occupational Safety and Health (NIOSH) of the Centers for Disease Control and Prevention (CDC)
 - Prior to interagency review, proposed CO₂ limits were 4% for more than 1 hour, and 6% for more than 2 minutes



Promulgation Process





Next Steps

- Proposal clears Agency
- Publication in Federal Register
- 30 day public comment period
- Venting of **all** refrigerants is currently prohibited by law—after SNAP listing, EPA will work to authorize CO₂ venting at service



SNAP Listing of New Refrigerants

- Chemical manufacturers are engaged in performance, safety, and toxicity testing
- 3-24 months needed for SNAP listing, depending on:
 - Completeness of toxicological data, including carcinogenicity, developmental effects, etc
 - Acute risks (toxicity or flammability)
 - Modeling exposure scenarios
 - Demonstrated performance of any needed mitigation technology
- EPA plans to act quickly when information is complete



**Barrier Removal and Standard
Harmonization
for
Refrigerants Allowed Under the
EC F-Gas Regulations**



EC, CARB, MACCCPP Agreement

- US EPA identified an indicative list of barriers to new refrigerants in global markets
- The European Commission, California Air Resources Board, and Mobile Air Conditioning Climate Protection Partnership agreed to resolve the barriers to refrigerants allowed by the EC regulation
- Kristen Taddonio is spearheading this effort



DoT Issue Near Resolution

- Current DOT accumulator requirement:
 - Accumulators must be built to withstand 5 times their charged pressure (49 CFR 174:306)
- Proposed solution
 - Exempt MACS under 173:220
 - Rely on SAE for safety standard
- Pending Approval from DOT Associate Administrator

OSHA Worker Safety Laws

Information- Employees must be told of operations in their work area where CO₂ is present, and where the written hazard communication and material safety data sheet for CO₂ are located. Employers must also explain the labeling system and the material safety data sheet to the employees. (Hazard Communication for Toxic and Hazardous Substances, 29 CFR 1910.1200)

Personal Protective Equipment- Employers must provide employees with proper protective equipment to use while handling CO₂. (General Requirements for Personal Protective Equipment, 29 CFR 1910:132)

Training Requirements- Employees must be trained in methods used to detect the presence or release of CO₂ in the work area, such as how to detect leaks, how to use/read continuous monitoring devices, etc. Employees must be trained in the physical and health hazards of the CO₂ in the work area, and they must also be trained in measures to protect themselves from CO₂ hazards, including appropriate work practices, emergency procedures, and personal protective equipment to be used. (Hazard Communication for Toxic and Hazardous Substances, 29 CFR 1910.1200)

Approved handling methods- Workers must handle CO₂ cylinders, portable tanks, rail tank cars, or motor vehicle cargo tanks in accordance with Compressed Gas Association Pamphlet P-1-1965. (General Requirements for Compressed Gasses, 29 CFR 1910-101)

Pressure relief devices- All compressed gasses must have pressure relief devices installed and maintained in accordance with Compressed Gas Association Pamphlets S-1.1-1963 and 1965 addenda and S-1.2-1963. (Safety Relief Devices for Compressed Gas Cylinders, 29 CFR 1910.101(c))

Equipment inspection- Employers must determine that CO₂ cylinders are in a safe condition to the extent that this can be determined by visual inspection. Visual and other inspections shall be conducted as prescribed in the Hazardous Materials Regulations of the Department of Transportation (49 CFR parts 171-179 and 14 CFR part 103). Where those regulations are not applicable, visual and other inspections shall be conducted in accordance with Compressed Gas Association Pamphlets C-6-1968 and C-8-1962. (Inspection of Compressed Gas Cylinders, 29 CFR 1910.101(a))

Worker Exposure- Exposure may not exceed 5,000 parts per million averaged over an eight-hour work day, with no short term exposure (15 minutes or less) above 30,000 parts per million. (Occupational Safety and Health Standards for Air Contaminants, 29 CFR 1910:1000)

Storage- OSHA requires that the storage of all compressed gases in cylinders, portable tanks, rail tank cars, or motor vehicle cargo tanks be in accordance with Compressed Gas Association Pamphlet P-1. (General Requirements for Compressed Gasses, 29 CFR 1910-101)



Personal Protective Equipment

Employers must provide employees with proper protective equipment to use while handling CO₂. CO₂ material safety data sheets provide information on the proper equipment to use.

General Requirements for Personal Protective Equipment, 29 CFR 1910:132



Training Requirements

Employees must be trained in methods used to detect the presence or release of CO₂ in the work area, such as how to detect leaks, how to use/read continuous monitoring devices, etc.

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Hazard Communication for Toxic and Hazardous Substances, 29 CFR 1910.1200



Cooperation Needed to Develop Standards that Satisfy Global Regulations

- EPA, SAE, and others collaborating on standard that will satisfy these requirements
- Global cooperation invited to develop servicing standard that will guarantee compliance. Contact Kristen Taddonio: (202)-343-9234 or taddonio.kristen@epa.gov

Global harmony in standards preferable to multiple requirements in many locations



State Prohibitions

- Flammable bans (Arkansas, District of Columbia, Connecticut, Florida, Idaho, Indiana, Iowa, Kansas, Louisiana, Maryland, Montana, North Dakota, Oklahoma, Texas, Utah, Virginia, Washington, Wisconsin)
- Toxic bans (Connecticut, Idaho, Indiana, Kansas, Louisiana, Maryland, North Dakota, Oklahoma, Texas, Utah, Virginia, Washington)
- Unclear implications for CO₂, HFC-152a, new refrigerants



Progress

- Identified state decision-making authorities
- Drafting a letter to these authorities requesting that they approve alternative refrigerants subject to safety requirements suggested in the letter
- You can help!
 - Provide safety mitigation information for alternative refrigerant systems
 - Sign on and support our request



Summary

- Some progress made
 - DoT accumulator requirements
 - Technology safety design sharing for standards harmonization
 - State barrier removal
- More work to do
 - Identifying other nations' safety requirements
 - Share safety mitigation data
 - Collaborate on state barriers



For More Information

Stephen O. Andersen (Mobile AC Partnership)
andersen.stephen@epa.gov, 1 202-343-9069

Kristen Taddonio (Barrier removal & standard harmonization)

taddonio.kristen@epa.gov, 1 202-343-9234

Karen Thundiyil (SNAP program)

thundiyil.karen@epa.gov, 1 202-343-9464