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[Page 55140-55149]
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ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 82

[EPA-HQ-OAR-2004-0488; FRL-8221-5]
RIN 2060-AM54

Protection of Stratospheric Ozone: Listing of Substitutes in the Motor Vehicle Air Conditioning Sector Under the Significant New Alternatives Policy (SNAP) Program

AGENCY: Environmental Protection Agency.

ACTION: Proposed rule.

SUMMARY: Under mandate from the Clean Air Act to review and approve alternatives to ozone-depleting substances, the Environmental Protection Agency (EPA) proposes to expand and amend the list of acceptable substitutes for ozone-depleting substances (ODS) through the Significant New Alternatives Policy (SNAP) program. Substitutes addressed in this proposal are for the motor vehicle air conditioning (MVAC) end-use within the refrigeration and air-conditioning sector. The proposed substitutes are non ozone-depleting gases and consequently do not contribute to stratospheric ozone depletion.

DATES: Comments must be received on or before October 23, 2006. Any person interested in requesting a public hearing, must submit such request on or before October 6, 2006. If a public hearing is requested, a separate notice will be published announcing the date and time of the public hearing and the comment period will be extended until 30 days after the public hearing to allow rebuttal and supplementary information regarding any material presented at the public hearing. Inquires regarding a public hearing should be directed to the contact person listed below.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA-HQ-OAR-2004-0488, by one of the following methods:

Federal eRulemaking Portal: http://www.regulations.gov.

Follow the online instructions for submitting comments.

E-mail: a-and-r-Docket@epa.gov.

Fax: (202) 566-1741.

Mail: Environmental Protection Agency, EPA Docket Center (EPA/DC), Mailcode 6102T, Attention Docket ID No. EPA-HQ-OAR-2004-0488, 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

Hand Delivery: Public Reading Room, Room B102, EPA West Building, 1301 Constitution Avenue, NW., Washington, DC.

Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. EPA-HQ-OAR-2004-0488. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at http://www.regulations.gov, including any personal information provided,

unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through http://www.regulations.gov or e-mail.

The http://www.regulations.gov Web site is an ``anonymous access'' system,

which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through http://www.regulations.gov

your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD-ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses.

Docket: All documents in the docket are listed in the http://www.regulations.gov index. Although listed in the index, some

information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in http://www.regulations.gov or in hard copy at the Air Docket, EPA/DC, EPA

West, Room B102, 1301 Constitution Ave., NW., Washington, DC. This Docket Facility is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Air Docket is (202) 566-1742.

FOR FURTHER INFORMATION CONTACT: For further information about this proposed rule, contact Karen Thundiyil by telephone at (202) 343-9464, or by e-mail at thundiyil.karen@epa.gov. Notices and rulemakings under the SNAP program are available on EPA's Stratospheric Ozone Web site at http://www.epa.gov/ozone/snap/regs. For copies of the full list of SNAP

decisions in all industrial sectors, contact the EPA Stratospheric Protection Hotline at (800) 296-1996. You also can find a complete chronology of SNAP decisions and the appropriate Federal Register citations at EPA's Stratospheric Ozone Web site at http://www.epa.gov/ozone/snap/chron.html
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SUPPLEMENTARY INFORMATION: This proposed action, if finalized, would provide motor vehicle manufacturers and their suppliers an additional refrigerant option for motor vehicle air conditioning systems. This proposed action would also modify the current acceptability of an approved substitute to include use conditions. The two refrigerants discussed in this proposed action are non ozone-depleting substances. Car manufacturers, component manufacturers and the MVAC service industry have all been actively engaged in the development of this rulemaking and are developing prototype systems with the use

[[Page 55141]]

conditions defined in this proposed rulemaking.

Table of Contents

I. Section 612 Regulatory Background

Section 612 of the Clean Air Act (CAA) authorizes EPA to develop a program for evaluating alternatives to ozone-depleting substances. EPA refers to this program as the Significant New Alternatives Policy (SNAP) program. The major provisions of section 612 are:

A. Rulemaking

Section 612(c) requires EPA to promulgate rules making it unlawful to replace any class I (e.g., chlorofluorocarbon, halon, carbon tetrachloride, methyl chloroform, methyl bromide, and hydrobromofluorocarbon) or class II (e.g., hydrochlorofluorocarbon) substance with any substitute that the Administrator determines may present adverse effects to human health or the environment where the Administrator has identified an alternative that (1) reduces the overall risk to human health and the environment, and (2) is currently or potentially available.

B. Listing of Unacceptable/Acceptable Substitutes

Section 612(c) also requires EPA to publish a list of the substitutes unacceptable for specific uses and to publish a corresponding list of acceptable alternatives for specific uses.

C. Petition Process

Section 612(d) grants the right to any person to petition EPA to add a substance to, or delete a substance from the lists published in accordance with section 612(c). The Agency has 90 days to grant or deny a petition. Where the Agency grants the petition, EPA must publish the revised lists within an additional six months.

D. 90-day Notification

Section 612(e) directs EPA to require any person who produces a chemical substitute for a class I substance to notify the Agency not less than 90 days before new or existing chemicals are introduced into interstate commerce for significant new uses as substitutes for a class I substance. The producer must also provide the Agency with the producer's unpublished health and safety studies on such substitutes.

E. Outreach

Section 612(b)(1) states that the Administrator shall seek to maximize the use of federal research facilities and resources to assist users of class I and II substances in identifying and developing alternatives to the use of such substances in key commercial

applications.

F. Clearinghouse

Section 612(b)(4) requires the Agency to set up a public clearinghouse of alternative chemicals, product substitutes, and alternative manufacturing processes that are available for products and manufacturing processes which use class I and II substances.

On March 18, 1994, EPA published the original rulemaking (59 FR 13044) which described the process for administering the SNAP program and issued EPA's first acceptability lists for substitutes in the major industrial use sectors. These sectors include: Refrigeration and air conditioning; foam blowing; solvents cleaning; fire suppression and explosion protection; sterilants; aerosols; adhesives, coatings and inks; and tobacco expansion. These sectors compose the principal industrial sectors that historically consumed the largest volumes of ozone-depleting substances.

For the purposes of SNAP, the Agency defines a ``substitute'' as any chemical, product substitute, or alternative manufacturing process, whether existing or new, intended for use as a replacement for a class I or class II substance. Anyone who produces a substitute must provide the Agency with health and safety studies on the substitute at least 90 days before introducing it into interstate commerce for significant new use as an alternative. This requirement applies to substitute manufacturers, but may include importers, formulators, or end-users, when they are responsible for introducing a substitute into commerce.

You can find a complete chronology of SNAP decisions and the appropriate Federal Register citations at EPA's Stratospheric Ozone Web site at http://www.epa.gov/ozone/snap/chron.html. This information is also available from the Air Docket (see Addresses section above for contact information).

II. Summary of Acceptability Determinations

EPA proposes to find HFC-152a and CO2, with use conditions acceptable refrigerant substitutes as replacements for CFC-12 in motor vehicle air conditioning (MVAC) systems. This determination applies to MVAC systems in newly manufactured vehicles. This acceptability determination does not apply to MVAC systems that were retrofitted to use HFC-134a and might be again retrofitted to either HFC-152a or CO2; nor to MVAC systems that initially were manufactured to use HFC-134a and that might be retrofitted to use HFC-152a and CO2. The HFC-152a and CO2 acceptability determinations are based on the results of risk screens and national safety standards.

In the original SNAP rulemaking,\1\ CO2 was found acceptable in new motor vehicle air conditioning systems, but EPA did not at that time base acceptability on use conditions now required by this rule. For various reasons, CO2 MVAC technology development took longer than anticipated and currently, no car manufacturer has put CO2 MVAC systems in production vehicles for general consumer use. However, manufacturers are developing

prototype air conditioning (A/C) systems that use CO2 and HFC-152a for motor vehicles sold in some foreign and domestic markets. This rule would facilitate and allow commercial deployment of the new refrigerants, but leaves refrigerant choice to the market. Since the original SNAP rulemaking, the risks of CO2 in a MVAC system without risk mitigation

[[Page 55142]]

strategies have been explored and examined. Now, informed with a new risk screen, the SNAP program has determined that the risks of CO2 will be comparable to the risks of HFC-134a only if use conditions are implemented.

\1\ 59 FR 13044; March 18, 1994.

In making the acceptability determinations, EPA assessed the impact of both HFC-152a and CO2 systems on human health and the environment; the focus was on the risks of exposure to potentially hazardous levels of refrigerant for both vehicle occupants and vehicle service technicians and how those risks compare to those associated with use of HFC-134a in MVACs.\2\ EPA identified scenarios where there was potential for a leak into the passenger compartment and potential for technicians to be exposed during servicing. EPA's review found that a foreseeable worst case scenario leak into the passenger compartment from either HFC-152a or CO2 air conditioning systems might lead to passenger exposures above risk levels associated with HFC-134a systems. However, safety devices could be added or engineered into new systems so that potentially hazardous concentrations could be avoided, making the risk comparable to that associated with HFC-134a systems. Therefore, EPA is listing HFC-152a and CO2 as acceptable with the use condition that engineering devices or mitigation strategies be employed so that in the event of a leak, the resulting concentrations of refrigerant in the free space and vehicle occupant breathing zone within the interior car compartment are maintained at safe levels. Air conditioning systems with two or more evaporators will generally have larger refrigerant charges and therefore will require more elaborate safety mitigation devices and/or strategies. Other organizations and industry groups that have assessed risks associated with HFC-152a and/or CO2 MVAC systems have also concluded that risk mitigation strategies in some form are necessary.[3] [4]

\2\ The predominant air conditioning refrigerant in newly manufactured motor vehicles is HFC-134a. In listing HFC-134a as an acceptable substitute, EPA found that exposure in motor vehicles would fall far below a threshold of concern (EPA, 1994).

\3\ RISA, 2002.

\4\ Rebinger, 2005.

EPA's analysis also found that the probability of potentially dangerous exposures is higher for service technicians than for passengers, but within the level of risk that technicians currently accept as part of their job. EPA recommends that service technicians receive additional training so they are knowledgeable about the different hazards associated with working on HFC-152a and CO2 systems when compared to HFC-134a systems. Consistent with Society of Automotive Engineer's Standard J639, prominent labeling of A/C systems with warning of ``High Pressure CO2'' and ``Flammable Refrigerant'' is required. In addition, the SNAP regulations require unique fittings for the two A/C refrigerants which will prevent accidents associated with adding refrigerant to the wrong type of A/C system.

The following sections present a more detailed discussion of the EPA's acceptability decisions for HFC-152a and CO2 MVAC systems. The listing decisions are summarized in Appendix B. The statements in the ``Comments'' column of the table in Appendix B provide additional information that is not legally binding under section 612 of the CAA. However, these statements may include information about binding requirements under other programs. Nevertheless, EPA strongly encourages users to use these substitutes in a manner consistent with the recommendations in the ``Comments'' section. In many instances, the comments simply refer to standard workplace safety practices that have already been identified in existing industry standards. Thus, many of these recommendations, if adopted, would not require significant changes in existing operating practices for the affected industry. Such recommendations should not be considered comprehensive with respect to legal obligations that may pertain to the use of the substitute.

III. SNAP Criteria for Evaluating Alternatives

When making acceptability decisions, EPA has considered toxicity, flammability, the potential for occupational and general population exposure, and environmental effects including ozone depletion potential, atmospheric lifetime, impacts on local air quality, and ecosystem effects of the alternatives. EPA evaluated the criteria set forth at 40 CFR 82.180(a)(7) in determining whether HFC-152a and CO2 are acceptable refrigerant substitutes for CFC-12 in the motor vehicle air conditioning sector. The Agency has determined that the Clean Air Act does not authorize EPA to regulate for global climate change purposes (Fabricant, 2003). EPA has not yet concluded how this determination would affect its consideration of the global warming potential of substitutes under the SNAP program. Regardless, for the substitutes considered here, the global warming potential (GWP) of the alternatives was not a determinative factor in EPA's acceptable subject to use conditions determination. The GWP for these substitutes is well below that of previously approved substitutes in this sector.

The data described below indicates that use of HFC-152a and CO2 with risk mitigation technologies does not pose greater risks compared to other substitutes approved in the MVAC sector.\5\ The review focused on the potential for hazardous exposures to the

refrigerants for vehicle occupants and for service technicians.

\5\ The predominant substitute in the MVAC sector is HFC-134a.

EPA and the U.S. Army (Research Development and Engineering Command) collaborated on analyzing the probability that HFC-152a or CO2 leaks into the passenger compartment would expose occupants to refrigerant concentration levels that could lead to driver performance decrements, adverse effects on passengers, or flammable concentrations of refrigerant. The flow of refrigerant into the passenger compartment was modeled using three-dimensional computational fluid dynamics (CFD) to predict localized refrigerant concentrations over time that would result from a leak.\6\ A typical six passenger sedan \7\ was modeled under a broad range of MVAC system operating modes (e.g., air conditioning on or off, fan on low or high, 100% recirculated air or 100% outside air), including worst case scenarios that would result in the maximum possible leak rate. The analysis assessed the potential frequency of vehicle occupant and technician exposure to elevated levels of CO2 and HFC-152a using ``fault tree analysis'' (FTA) which EPA has previously used to assess frequency and potential consequences of HFC-134a refrigerant releases (Jetter et al., 2001). The analysis quantified the potential for occupant exposure as a result of a range of leak scenarios and usage modes where no risk mitigation systems were engineered into the A/C systems, as well as scenarios that included engineering technology to reduce exposures. The probability of exposure during servicing was assessed for trained technicians and for untrained ``do-it-yourselfers'' (DIYers) in a variety of work situations.

\6\ The U.S. Army CFD model was previously developed for risk assessment of other chemicals.

\7\ Modeling assumed 6 adult passengers in the car.

In this rulemaking, CO2 and HFC-152a risks are considered in relation to the risks associated with the predominant ozone-depleting substance (ODS) refrigerant substitute in MVACs, HFC-134a. HFC-134a is a non-flammable, low toxicity refrigerant. The

[[Page 55143]]

EPA's SNAP program does not require that new substitutes be found risk-free to be found acceptable. In reviewing the acceptability of proposed substitutes, EPA considers how each substitute can be used within a specific application and the resulting risks and uncertainties surrounding potential health and environmental effects. The EPA does not want to intercede in the market's choice of available substitutes, unless a proposed substitute is clearly more harmful to human health and the environment than other alternatives.

CO2 and HFC-152a MVAC systems are not yet commercially available. In the absence of empirical data, EPA selected upper bound

values for the fault tree probability inputs that would tend to lead to higher estimates of equipment failure or leak rates (i.e., worst case scenarios), and therefore higher probabilities of passenger exposures than might typically be encountered, such as using a car with a high ratio of refrigerant charge size to passenger compartment volume.

IV. Carbon Dioxide MVAC Systems

A. Occupant Exposure

Numerous studies indicate that a spectrum of health effects are associated with increasing CO2 exposures. These health effects range from symptomatic effects to death (EPA, 2005). Individuals exposed to CO2 concentrations as low as 4-5% over a few minutes reported headache, uncomfortable breathing and dizziness (Schulte, 1964; Schneider and Truesdale, 1922; Patterson et al., 1955). Significant performance degradation (e.g., reaction time) was noted in pilots exposed to 5% CO2 (Wamsley et al., 1975, cited in Wong, 1992). Individuals exposed to 6% CO2 for periods as short as two minutes had hearing and visual disturbances (Gellhorn, 1936), and significant reasoning and performance decrements have been observed in healthy young adults after exposures of 5 minutes to 7.5% CO2 (Sayers, 1987). Concentrations of 10% CO2 and higher can cause loss of consciousness, seizures, or even death (Hunter, 1975; Lambertsen, 1971; OSHA, 1989).

Elevated CO2 concentrations can result from human respiration in a sealed space, such as a car, without the introduction of fresh air. For example, after 60 minutes in a sub-compact car with four adult passengers and the A/C system in recirculation mode, the total CO2 concentration is estimated to be approximately 2.4% (EPA, 2005). In designing their systems and necessary mitigation devices, original equipment manufacturers (OEMs) should account for potentially elevated background CO2 concentrations that can result without a discharge of CO2 into the passenger compartment.

1. Upper Limit for Vehicle Occupant Exposure

In proposing the upper CO2 limit for vehicle occupant exposure, EPA relied on guidance from National Institute for Occupational Safety and Health (NIOSH) of the Centers for Disease Control and Prevention. Based on adverse effects associated with overexposure to CO2 ranging from rapid breathing and heart palpitations, headache, sweating, shortness of breath and dizziness, to convulsions and death, NIOSH has adopted a Recommended Exposure Limit (REL) for short-term CO2 exposure of 3% averaged over 15 minutes. NIOSH's REL for short-term CO2 exposure is the same as the American Conference of Governmental Industrial Hygienists (ACGIH) short-term exposure limit (STEL) for CO2.

EPA focused on short-term passenger exposures for three reasons. First, occupants experiencing decreased cooling of the A/C system as a result of refrigerant leaks may also respond by opening windows or increasing fan speed. The introduction of outside air by a vehicle occupant would mix with discharged CO2 and dilute a potentially hazardous concentration. The second reason is that average

trip duration is about 30 minutes.\8\ The third reason is that vehicle occupants who start to experience abnormal breathing or other physiological effects of CO2 exposure will likely react by increasing the fan speed or opening windows to increase their comfort level by reducing the sense of stuffiness. EPA proposes that direct loop refrigerant systems that have the potential for release of refrigerant into the occupant compartment or the A/C air distribution system, must have safety mitigation necessary to prevent concentrations higher than the CO2 STEL (3% averaged over 15 minutes). EPA seeks comment on this use condition and also whether a maximum CO2 ceiling in the breathing zone should be applied in addition to the 3% free space limit averaged over 15 minutes. A breathing zone ceiling may provide additional assurance regarding vehicle driver alertness. Public comments suggesting a breathing zone ceiling should specify the suggested level, justified by literature from scientific, safety standard, and other sources published worldwide.

\8\ Atkinson, 2002.

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2. Potential Occupant Exposure With No Safety Mitigation

Computational fluid dynamics (CFD) modeling demonstrated where peak concentrations of refrigerant could appear in the passenger compartment as a result of different leak events, and whether those peaks are likely to be above the CO2 STEL. U.S. Army modeling conducted as part of the EPA risk analysis indicated that CO2 leaks in a stationary or slowly moving vehicle in full recirculation mode, without mitigation devices or other safety features could result in peak concentrations of about 10% and levels above 6% for roughly an hour which are well above the CO2 STEL.

3. Occupant Exposure With Risk Mitigation

The analyses indicate that direct expansion CO2 systems without additional safety features could result in vehicle occupant exposures above the CO2 STEL. However, based on the U.S. Army CFD modeling, properly engineered safety systems added to CO2 systems can reduce the chance of occupant exposure to levels above the CO2 STEL, thus making the risks of CO2 comparable to HFC-134a. EPA is interested in comment on the adequacy of available mitigation systems for CO2 in minimizing risks to passengers.

One possible strategy to limit refrigerant leakage into occupied passenger space is to detect the leak and activate a device referred to as a ``squib valve'' to vent the CO2 to a location outside of the passenger compartment, such as a wheel well or tail pipe. The CFD modeling estimated peak concentrations in the passenger compartment when a squib valve is used to evacuate the refrigerant charge. The U.S. Army CFD modeling conducted to date indicates that when the squib valve is activated within 10 seconds after a leak event is detected, the maximum concentration remains well below the CO2 STEL. The Agency is interested in comment on whether a squib valve activation faster than 10 seconds would be needed, or whether any squib valve

technology is sufficient to protect against possible adverse effects associated with very brief (e.g., 5 second) potentially elevated exposures (e.g., 5-10% CO2), and the likelihood that occupants would encounter such high exposures.

Another way to reduce CO2 exposure would be to increase the amount of outside air that is introduced to the car. CFD modeling revealed that when the A/C system uses 100% outside air, as opposed to recirculated air, CO2 levels

[[Page 55144]]

remained below the CO2 STEL after a foreseeable worst case scenario leak.\9\

\9\ Although this would effectively mitigate safety hazards there would likely be a large fuel efficiency penalty if this strategy were used since the system would not use recirculated air at all.

Other potential risk mitigation strategies that reduce the likelihood of exceeding the CO2 STEL in the free space of the passenger compartment include:

- Eliminating the possibility of passenger exposure by separating the refrigerant from the passenger compartment with secondary loop systems.
- Evaporator isolation valves whose default position is closed. Such valves would allow only a fraction of the total charge to be released into the passenger compartment in the event of a leak.
- Close-coupled or hermetically sealed systems that would both reduce charge size and decrease the possibility of a leak event.
- Automatic increases in the air exchange in the passenger compartment upon detection of leaks.
- Automatic venting of refrigerant outside the passenger compartment in the air exchange of the passenger compartment upon detection of leaks.

The Agency is interested in comment on whether these risk mitigation strategies are technically feasible, considering fuel efficiency and overall system performance criteria.

B. Service Technician Exposure

Risks to service personnel from CO2 systems can result from the high pressure of the systems. Carbon dioxide A/C systems are high-pressure systems that require service personnel to take safety precautions and measures. Injury could occur as a result of the potentially high force of an unexpected failure of system components or from gas escaping during parts disassembly.

Risks to service personnel from CO2 systems can also come about from overexposure to CO2 in an unexpected system release. Because CO2 is heavier than air, the gas will sink and could cause high concentrations in low lying areas such as service pits. Service technicians should be aware of the potential for

CO2 build-up in these areas and protect against exposure to high concentrations. The Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) for CO2 is 5,000 parts per million (ppm) (or 0.5%) over an eight hour time weighted average.

EPA analysis revealed that the risk of potentially hazardous exposure to CO2 as a result of working on MVAC systems is within the level of risk service technicians currently accept as part of their job. Technicians handle high pressure gases such as CO2 on a daily basis. However, it is recommended that service technicians become knowledgeable about the hazards associated with CO2 systems and that additional training be provided.

``Do-it-yourself'' repairers (DIYers) working with CO2 systems face the risks of working with high pressure, including potentially high force from an unexpected leak from the system or a CO2 tank. Consistent with Society of Automotive Engineers (SAE) J639 Standard, CO2 systems must be labeled with a nameplate or tag indicating the air conditioning system is under high pressure and should only be serviced by qualified personnel. These labels combined with unique fittings for CO2 systems are expected to help mitigate potential for risk or injury to DIYers.

C. Environmental Information

Carbon dioxide has an ozone depletion potential (ODP) of zero. The original ozone depleting substance in MVACs, CFC-12, has an ODP of 1.\10\ The predominant MVAC substitute, HFC-134a has an ODP of zero.\11\ Carbon dioxide, CFC-12, and HFC-134a are all excluded from the definition of volatile organic compound (VOC) under CAA regulations (see 40 CFR 51.100(s)) addressing the development of State implementation plans (SIPs) to attain and maintain the national ambient air quality standards.

\10\ World Meteorological Organization (WMO) Science Assessment of Ozone Depletion, 2002.

\11\ WMO Science Assessment of Ozone Depletion, 2002.

D. Acceptability Determination

EPA proposes to list CO2 acceptable with the use condition that MVAC systems are designed so that occupant exposure to concentrations above the CO2 STEL of 3% averaged over 15 minutes are avoided, even in the event of a leak. We request comment on whether a maximum ceiling CO2 level should be applied in the driver and passenger breathing zone and the scientific basis for such a limit. The addition of the squib valve/directed release system is one possible strategy for mitigating risk for CO2 systems. Other mitigation strategies may also prove equally or more effective.

Prominent labeling of CO2 MVAC systems with a warning such as ``CAUTION SYSTEM CONTAINS HIGH PRESSURE CARBON DIOXIDE (CO2)--TO BE SERVICED ONLY BY QUALIFIED PERSONNEL'' is required. Consistent with Society of Automotive Engineers (SAE) J639

Standard, this label should be mounted in the engine compartment on a component that is not normally replaced and where it can be easily seen. This label must include CO2 identification information and indicate that CO2 is potentially toxic.

Original equipment manufacturers (OEMs) are required to keep records of the tests they perform to ensure that MVAC systems are safe and are designed with sufficient safety mitigation devices to ensure that occupants are not exposed to levels above the CO2 STEL under foreseeable circumstances. Presently, no standard test procedure exists to determine that concentrations of concern are not exceeded. EPA is working with SAE to develop these test standards and expects them to be in place by the time that CO2 MVAC systems are deployed in U.S. vehicles. Other use conditions are already established in Appendix D to subpart G of 40 CFR part 82 that are applicable to all substitute refrigerants in MVAC systems (e.g., unique fittings and labels).

V. HFC-152a MVAC Systems

A. Toxicity and Flammability

The American Industrial Hygienists Association (AIHA) Workplace Environmental Exposure Limit (WEEL) (8 hour time weighted average) for HFC-152a is 1000 ppm (0.1% v/v), the highest occupational exposure limit allowed under standard industrial hygiene practices for any industrial chemical. The toxicity profile of HFC-152a is comparable to CFC-12 and its most prevalent substitute, HFC-134a. The lowest observed adverse effect level for HFC-152a toxicity (15%) is above the level of flammability concern, discussed below, so protecting against flammable concentrations protects against toxic conditions as well.

A wide range of concentrations has been reported for HFC-152a flammability where the gas poses a risk of ignition and fire (3.7%-20% by volume in air) (Wilson, 2002). Different test conditions, impurities and the measurement approach can all contribute to the range of flammable concentrations of HFC-152a. The lower flammability limit (LFL) for HFC-152a has been tested by many laboratories using different testing protocols with results ranging from 3.7% to 4.2%. EPA selected the lowest reported LFL to assess the potential for passenger exposure and predict localized pockets of refrigerant concentrations within the passenger compartment. This selection increases confidence that the substitute

[[Page 55145]]

is regulated in a manner that is protective of the general population.

Protecting against flammable concentrations of HFC-152a also protects against toxic conditions because the lowest observed adverse effect level (LOAEL) of HFC-152a is far above the level of flammability concern.

1. Upper Limit of Occupant Exposure

The lowest reported LFL for HFC-152a is 3.7%, which EPA considers to pose a fire hazard to occupants and technicians. To assess the potential for passenger exposure and predict localized pockets of

greater refrigerant concentrations in specific locations within the passenger compartment, EPA used 3.7% as the upper limit of occupant exposure.

The upper limit of occupant exposure to HFC-152a protects against the possibility of flammability. It is important to note that when burned or exposed to high heat, HFC-152a like all fluorocarbons including CFC-12 and HFC-134a, forms acid byproducts including hydrofluoric acid (HF)--a severe respiratory irritant.\12\ OSHA has set a Permissible Exposure Limit (PEL) 8-hour occupational exposure limits for HF at 3 ppm which is the upper allowable limit for worker exposure. Passenger exposure to HF could only occur as a result of a large leak in the presence of an ignition source. EPA's approach in the risk screen and in setting use conditions is to prevent any fire risk associated with HFC-152a use in MVAC systems, which would also prevent any potential passenger exposure to HF.

\12\ These decomposition products have a sharp, acrid odor even at concentrations of only a few parts per million.

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2. Potential Occupant Exposure With No Safety Mitigation

U.S. Army computational fluid dynamics (CFD) modeling simulated various leakage scenarios into the passenger compartment and the potential for occupant exposures. As an initial screening tool, simplified modeling was conducted by assuming uniform mixing of passenger compartment air. This type of modeling does not account for the pockets of flammable refrigerant that can occur. The results indicate that concentrations of HFC-152a that are roughly one-half the lower flammable limit (2%) would be reached in all recirculation modes (at various fan speeds and A/C on and off) for a stationary vehicle. More complex modeling showed that localized concentrations exceeding the LFL would occur with minimal mitigation (see below). Therefore, this substitute would pose increased risk compared to HFC-134a in the absence of sufficient mitigation technology.

3. Occupant Exposure With Safety Mitigation

U.S. Army CFD modeling included in the risk analysis indicates that occupant exposures could be reduced if risk mitigation technology was incorporated that reduced the amount of HFC-152a that entered the passenger compartment in the event of a leak.

A 10-second squib valve activation time in a HFC-152a system resulted in estimated localized concentrations greater than 3.7% v/v in close proximity to the vent for a total of 14 seconds. In comparison, a HFC-152a system with no squib valve resulted in estimated localized concentrations greater than 3.7% v/v in close proximity to the vent for 35 seconds. Given the very small areas and time frames of potential exposures involved, EPA believes that 10 seconds is an appropriate upper bound for the valve activation time, unless the system design can also ensure a lower release rate. EPA is interested in comments on whether a squib valve activation faster than 10 seconds is necessary, or whether any squib valve technology is sufficient to prevent potentially hazardous concentrations (i.e., greater than 3.7% for 15 seconds).

We also assessed the introduction of outside air through the A/C system to investigate whether this would be useful in hazard mitigation. CFD modeling showed that potentially flammable concentrations would exist for 5 minutes with the introduction of 50% outside air, and for 3 minutes with 100% outside air using the simplified modeling. While the introduction of outside air alone does not yield acceptable outcomes, introducing some outside air at all times in addition to another mitigation strategy may be a viable option.

Other potential risk mitigation strategies that reduce the likelihood of exceeding the HFC-152a LFL of 3.7% for more than 15 seconds may include:

Eliminating the possibility of HFC-152a in the passenger compartment by placing the refrigerant only in the engine compartment with secondary loop systems.

Evaporator isolation valves whose default position is closed. Such valves would allow only a fraction of the total charge to be released into the passenger compartment in the event of a leak.

Close-coupled or hermetically sealed systems that would both serve to reduce charge size and decrease the possibility of a leak event.

Automatic increases in the air exchange in the passenger compartment upon detection of leaks.

Automatic venting of HFC-152a outside the passenger compartment in the air exchange of the passenger compartment upon detection of leaks.

The Agency is interested in comment on whether these risk mitigation strategies are technically feasible, considering fuel efficiency and overall system performance criteria.

B. Service Technician Exposure

Fault Tree Analysis (FTA) found that the risk of potentially hazardous exposure to HFC-152a is higher for service technicians than for occupants driving in vehicles with no safety mitigation technology. The AIHA occupational exposure limit for HFC-152a is 1000 ppm (0.1% v/v averaged over 8-hours). The risk of exposure while servicing vehicles depends not only on the number of vehicles a given service technician or shop handles, but also on service technician experience and training. With proper mitigation and training, the frequency of these exposures can be reduced dramatically. Further, EPA believes, based on input from service technicians, the flammability potential of HFC-152a is within the level of risk technicians currently accept as part of their job. Technicians handle flammables comparable to HFC-152a on a daily basis. It is recommended however, that additional training be provided to service technicians so that they are knowledgable about the different hazards associated with working on HFC-152a systems compared to CFC-12 or HFC-134a systems. EPA is currently working with A/C service and technical associations to anticipate new systems and to modify training, as needed.

``Do-it-yourself'' repairers (DIYers) working with HFC-152a systems face the risks of working with a slightly flammable substance. Consistent with Society of Automotive Engineers (SAE) J639 Standard,

HFC-152a systems should be labeled with a nameplate or tag indicating the air conditioning system is under high pressure and should only be serviced by qualified personnel. These labels combined with unique fittings for HFC-152a systems are expected to help mitigate potential for risk or injury to DIYers.

[[Page 55146]]

C. Environmental Information

HFC-152a has an ODP of zero.\13\ The original ozone depleting substance in MVACs, CFC-12, has an ODP of 1. The predominant MVAC substitute, HFC-134a has an ODP of zero.\14\ HFC-152a, CFC-12, and HFC-134a all are excluded from the definition of VOC under CAA regulations (see 40 CFR 51.100(s)) addressing the development of State implementation plans (SIPs) to attain and maintain the national ambient air quality standards

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\13\ WMO Science Assessment of Ozone Depletion, 2002.
\14\ WMO Science Assessment of Ozone Depletion, 2002.

D. Acceptability Determination

Within the refrigeration and air-conditioning sector, EPA proposes to find HFC-152a acceptable with the use condition that MVAC systems are designed so that foreseeable leaks into the passenger compartment do not result in HFC-152a concentrations at or above the lowest LFL of 3.7% for more than 15 seconds. EPA seeks comment on whether 15 seconds is sufficiently protective. The addition of the squib valve/directed release system is one effective strategy for mitigating risk for HFC-152a systems. Other mitigation strategies may also prove effective.

Prominent labeling of HFC-152a A/C systems is required with warning such as ``CAUTION SYSTEM CONTAINS POTENTIALLY FLAMMABLE HFC-152a REFRIGERANT--TO BE SERVICED ONLY BY QUALIFIED PERSONNEL''. Consistent with SAE J639 Standard, this label should be mounted in the engine compartment on a component that is not normally replaced and where it can be easily seen. This label should include refrigerant identification information and indicate the refrigerant is potentially flammable. HFC-152a systems operate at pressures similar to those of HFC-134a systems, with which technicians are familiar; therefore EPA has determined that additional labeling to address high pressure is unnecessary.

Original equipment manufacturers (OEMs) are required to keep records of the tests they perform to ensure that MVAC systems are safe and are designed with sufficient safety mitigation devices to ensure that occupants are not exposed to levels of HFC-152a at or above 3.7% for more than 15 seconds. Presently, no standard test procedure exists to determine that concentrations of concern are not exceeded, but EPA is working together with stakeholders and standards organizations to develop these test standards. The Agency expects these standards to be in place by the time that HFC-152a MVAC systems are deployed in U.S. vehicles. Other use conditions already established in Appendix D to

Subpart G of 40 CFR Part 82 are applicable to all substitute refrigerants in MVAC systems (e.g. unique fittings and labels).

VI. Other Use Conditions Applicable to Motor Vehicle Air Conditioning Systems

On October 16, 1996, (61 FR 54029), EPA promulgated a final rule that prospectively applied certain conditions on the use of any refrigerant used as a substitute for CFC-12 in motor vehicle air conditioning systems (Appendix D of Subpart G of 40 CFR part 82). That rule provided that EPA would list new refrigerant substitutes in future notices of acceptability and all such refrigerants would be subject to the use conditions stated in that rule. Therefore, the use of both CO2 and HFC-152a in motor vehicle air conditioning systems must follow the standard conditions imposed on refrigerant substitutes previously listed by SNAP, including:

Use of unique fittings--identified by SAE standard J639 and subject to EPA approval;

Application of a detailed label identifying the refrigerant in use and if it is potentially flammable or toxic \15\; and

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\15\ This proposal specifies the language to be used for this label to warn technicians of the risks associated with HFC-152a and CO\2\.

Installation of a high-pressure compressor cutoff switch on systems equipped with pressure relief devices.

Because HFC-152a and CO2 retrofits of CFC-12 or HFC-134a are prohibited by EPA, this document does not consider the additional SNAP requirements for MVAC substitutes approved for use in retrofits.

VII. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order (EO) 12866 (58 FR 51735, October 4, 1993), this action is a ``significant regulatory action.'' It raises novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order. Accordingly, EPA submitted this action to the Office of Management and Budget (OMB) for review under EO 12866 and any changes made in response to OMB recommendations have been documented in the docket for this action.

B. Paperwork Reduction Act

This action does not impose any new information collection burden. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize

technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

This proposed rule is an Agency determination. It contains no new requirements for reporting. The only new recordkeeping requirement involves customary business practice. The Office of Management and Budget (OMB) has previously approved the information collection requirements contained in the existing regulations in subpart G of 40 CFR part 82 under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. and has assigned OMB control numbers 2060-0226 (EPA ICR No. 1596.05). This Information Collection Request (ICR) included five types of respondent reporting and record keeping activities pursuant to SNAP regulations: submission of a SNAP petition, filing a SNAP/TSCA Addendum, notification for test marketing activity, record keeping for substitutes acceptable subject to use restrictions, and record-keeping for small volume uses. This proposed rule requires minimal record-keeping of studies done to ensure that MVAC systems using either HFC-152a or CO2 meet the requirements set forth in this rule. Because it is customary business practice that automotive systems manufacturers and automobile manufacturing companies conduct and keep on file failure mode and Effect Analysis (FMEA) on any potentially hazardous part or system, we believe this requirement will not impose an additional paperwork burden.

An Agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations are listed in 40 CFR Part 9 and 48 CFR Chapter 15.

[[Page 55147]]

Copies of the SNAP ICR document(s) may be obtained from Susan Auby, by mail at the Office of Environmental Information, Office of Information Collection, Collection Strategies Division; U.S. Environmental Protection Agency (2822T); 1200 Pennsylvania Ave., NW., Washington, DC 20460, by e-mail at auby.susan@epa.gov, or by calling (202) 566-1672.

C. Regulatory Flexibility Act (RFA)

The RFA generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions. For purposes of assessing the impacts of this rule on small entities, small entity is defined as: (1) A small business as defined by the Small Business Administration's (SBA) regulations at 13 CFR 121.201; (2) a small governmental jurisdiction

that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.

After considering the economic impacts of this proposed rule on small entities, we certify that this action will not have a significant economic impact on a substantial number of small entities. The requirements of this proposed rule impact car manufacturers and car air conditioning system manufacturers only. These businesses do not qualify as small entities. The change in CO2 acceptability to include use conditions and the imposition of use conditions for HFC-152a does not impact the small businesses. The change does not impact car manufacturers because production-quality CO2 and HFC-152a MVAC systems are not manufactured yet. Consequently, no change in business practice is required by this proposed rule and will not impose any requirements on small entities.

We continue to be interested in the potential impacts of the proposed rule on small entities and welcome comments on issues related to such impacts.

D. Unfunded Mandates Reform Act

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104-4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and tribal governments and the private sector. Under section 202 of the UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with ``Federal mandates'' that may result in expenditures to State, local, and tribal governments, in the aggregate, or to the private sector, of $100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements. EPA has determined that this rule does not contain a Federal mandate that may result in expenditures of $100 million or more for State, local, and tribal governments, in the aggregate, or the private sector in any one year. This proposed rule does not affect State, local, or tribal governments. The enforceable requirements of

this proposed rule related to integrating risk mitigation devices and documenting the safety of substitute refrigerant MVAC systems affect only a small number of manufacturers of car air conditioning systems and car manufacturers. This proposal provides additional technical options allowing greater flexibility for industry in designing consumer products. The impact of this rule on the private sector will be less than $100 million per year. Thus, this rule is not subject to the requirements of sections 202 and 205 of the UMRA. EPA has determined that this rule contains no regulatory requirements that might significantly or uniquely affect small governments. This regulation applies directly to facilities that use these substances and not to governmental entities. The change in acceptability of CO2 does not impact the private sector because manufacturers are not producing systems under the current acceptability regulation. This proposed rule does not mandate a switch to these substitutes; consequently, there is no direct economic impact on entities from this rulemaking.

E. Executive Order 13132: Federalism

Executive Order 13132, entitled ``Federalism'' (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure ``meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.'' ``Policies that have federalism implications'' is defined in the Executive Order to include regulations that have ``substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.''

This proposal does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. This regulation applies directly to facilities that use these substances and not to governmental entities. Thus, Executive Order 13132 does not apply to this rule.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

Executive Order 13175, entitled ``Consultation and Coordination with Indian Tribal Governments'' (65 FR 67249, November 6, 2000), requires EPA to develop an accountable process to ensure ``meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications.'' ``Policies that have tribal implications'' is defined in the Executive Order to include regulations that have ``substantial direct effects on one or more Indian tribes, on the relationship between the Federal government and the Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes.''

[[Page 55148]]

This proposed rule does not have tribal implications. It will not

have substantial direct effects on tribal governments, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes, as specified in Executive Order 13175. This proposed rule does not significantly or uniquely affect the communities of Indian tribal governments, because this regulation applies directly to facilities that use these substances and not to governmental entities. Thus, Executive Order 13175 does not apply to this proposed rule.

G. Executive Order 13045: Protection of Children From Environmental Health and Safety Risks

Executive Order 13045: ``Protection of Children from Environmental Health Risks and Safety Risks'' (62 FR 19885, April 23, 1997) applies to any rule that: (1) Is determined to be ``economically significant'' as defined under Executive Order 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

This proposed rule is not subject to the Executive Order because it is not economically significant as defined in Executive Order 12866, and because the Agency does not have reason to believe the environmental health or safety risks addressed by this action present a disproportionate risk to children. There are no experimental or anecdotal data to indicate that children are more sensitive than adults to the adverse effects of increased CO2 environments.\16\ The exposure limits and acceptability listings in this proposed rule apply to car occupants, and in particular car drivers and service technicians. These are areas where we expect adults are more likely to be present than children, and thus, the agents do not put children at risk disproportionately.

\16\ Risk Analysis for Alternative Refrigerant in Motor Vehicle Air Conditioning (EPA, 2005).

The public is invited to submit or identify peer-reviewed studies and data, of which the agency may not be aware, that assesses the potential effects of these alternatives on children.

H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use

This proposed rule is not a ``significant energy action'' as defined in Executive Order 13211, ``Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use'' (66 FR 28355 (May 22, 2001)) because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. This action would impact manufacturing and repair of alternative MVAC systems.

Preliminary information indicates that these new systems may be more energy efficient than currently available systems in some climates. Therefore, we conclude that this rule is not likely to have any adverse effects on energy supply, distribution or use.

I. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (``NTTAA''), Public Law No. 104-113, Section 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards. This proposed rule regulates the safety and deployment of new substitutes for MVAC systems. EPA is referencing the Society of Automotive Engineers (SAE) standard J639, which is currently being revised to include requirements for safety and reliability for HFC-152a and CO2 systems.

VIII. References

The documents below are referenced in the preamble. All documents are located in the Air Docket at the address listed in section I.B.1 at the beginning of this document. Unless specified otherwise, all documents are available in Docket ID No. EPA-HQ-OAR-2004-0488 at http://www.regulations.gov.

Atkinson, W. 2002. Consumer Use of A/C Systems. SAE Automotive Alternate Refrigerant Systems Symposium 2002. Phoenix, Arizona.
Gellhorn, E. 1936. The Effect of O2-Lack, Variations in the Carbon Dioxide-Content of the Inspired Air, and Hyperpnea on Visual Intensity Discrimination. American Journal of Physiology. 115: 679-684.
Hunter D. 1975. The diseases of occupations. 5th ed. London: Hodder and Stoughton, p. 618.
Jetter, J., R. Forte, and R. Rubenstein. 2001. Fault Tree Analysis for Exposure to Refrigerants Used for Automotive Air Conditioning in the United States. Risk Analysis. 21(1):157-170.
Lambertsen, C.J. 1971. Therapeutic Gases: Oxygen, Carbon Dioxide, and Helium. In Drill's Pharmacology in Medicine, ed. J.R. DiPalma, 1145-1179. New York, NY: McGraw-Hill.
Memo to Acting Administrator, Marianne L. Horinko. 2003. EPA's Authority to Impose Mandatory Controls to Address Global Climate Change under the Clean Air Act, from Robert E. Fabricant.
National Institute for Occupational Safety and Health. 1976. Criteria for Document for Carbon Dioxide. NIOSH Publication No. 76-194.
National Institute for Occupational Safety and Health. 2005. NIOSH Pocket Guide to Chemical Hazards. NIOSH Publication No. 2005-151.

Occupational Safety and Health Administration. 1989. Carbon Dioxide, Industrial Exposure and Control Technologies for OSHA Regulated Hazardous Substances, Volume I of II, Substance A-I. Occupational Safety and Health Administration. Washington, DC: U.S. Department of Labor. March.
Patterson, J.L., H. Heyman, L.L. Battery, R.W. Ferguson. 1955. Threshold of response of the cerebral vessels of man to increases in blood carbon dioxide. Journal of Clinical Investigations. 34:1857-1864.
Rebinger, C. 2005. Safety Concept Proposal for R744 A/C Systems in Passenger Cars--Update 2005. VDA Alternate Refrigerant Winter Meeting 2005. Saalfelden, Austria.
RISA Sicherheitsanalysen. 2002. Safety-Study for a Prototypical Mobile R744 A/C System. VDA Alternate Refrigerant Winter Meeting 2002. Saalfelden, Austria
Sayers, J.A., R.E.A. Smith, R.L Holland, W.R. Keatinge. 1987. Effects of Carbon Dioxide on Mental Performance. Journal of Applied Physiology. 63(1):25-30.
Schneider, E.C., E. Truesdale. 1922. The effects on circulation and respiration of an increase in the carbon dioxide content of blood in man. American Journal of Physiology. 63:155-175.
Schulte, J.H. 1964. Sealed environments in relation to health and disease. Archives of Environmental Health. 8: 438-452.
Society of Automotive Engineers (SAE). 2005. Surface Vehicle Standard J639. Safety Standards for Motor Vehicle Refrigerant Vapor Compression Systems.
United States Environmental Protection Agency (EPA). 1994. SNAP Technical Background Document: Risk Screen on the Use of Substitutes for Class I Ozone-Depleting Substances: Refrigeration and Air Conditioning.
United States Environmental Protection Agency (EPA). 2005. Risk Analysis for Alternative Refrigerant in Motor Vehicle Air Conditioning.
Wilson, D.P., R. Richard. 2002. Determination of Refrigerant Lower

[[Page 55149]]

Flammability Limits in Compliance with Proposed Addendum p to Standard 34. HI-02-7-2 (RP-1073).
Wong, K.L. 1992. Carbon Dioxide. Internal Report, Johnson Space Center Toxicology Group. National Aeronautics and Space Administration: Houston, TX. 1987.

List of Subjects in 40 CFR Part 82

Environmental protection, Administrative practice and procedure, Air pollution control, Reporting and recordkeeping requirements.

Dated: September 14, 2006.
Stephen L. Johnson,
Administrator.

For the reasons set out in the preamble, 40 CFR part 82 is proposed to be amended as follows:

PART 82--PROTECTION OF STRATOSPHERIC OZONE

1. The authority citation for part 82 continues to read as follows:

Authority: 42 U.S.C. 7414, 7601, 7671-7671q.

Subpart G--Significant New Alternatives Policy Program

2. The first table in Subpart G to Appendix B of part 82 is amended by adding 2 new entries to the end of the table to read as follows:

Appendix B to Subpart G of Part 82--Substitutes Subject to Use Restrictions and Unacceptable Substitutes

Refrigerants--Acceptable Subject to Use Conditions

Application	Substitute	Decision	Conditions	Comments
* * * * * * *				
CFC-12 Automobile Motor Vehicle Air Conditioning (New equipment only).	Carbon Dioxide (CO2) as a substitute for CFC-12.	Acceptable subject to use conditions.	Engineering strategies and/or devices shall be incorporated into the system such that foreseeable leaks into the passenger compartment do not result in concentrations of the MVAC as stated in SAE J1739.	Additional training for service technicians recommended. Manufacturers should conduct and keep on file Failure Mode and Effect Analysis (FEMA) on the free space \1\

greater than CO2 short-term exposure limit (STEL) of 3% v/v for 15 minutes. Manufacturers must adhere to all the safety requirements listed in the Society of Automotive Engineers (SAE) Standard J639, including unique fittings and a high pressure system warning label.	In designing the safety mitigation strategies and/or devices, manufacturers should factor in background CO2 concentrations potentially contributed from normal respiration by the maximum number of vehicle occupants.		
CFC-12	Automobile Motor Vehicle Air Conditioning (New equipment only).	HFC-152a as a substitute for CFC-12.	Acceptable subject to Additional use conditions. Engineering strategies and/or devices shall be incorporated into the system such that foreseeable	Motor Vehicle Air Conditioning Additional training for service technicians recommended. Manufacturers should conduct and keep on

leaks into the passenger compartment do result in concentrations 3.7% v/v or in any of the space \2\ inside the passenger compartment for more than 15 seconds. Manufacturers must adhere to all the safety requirements listed in the Society of Automotive Engineers (SAE) Standard J639, including unique fittings and a flammable refrigerant

file Failure Mode and Effect Analysis (FMEA) on the MVAC as stated in SAE J1739.

not HFC-152a

of above part free

warning label.

\1\ Free space is defined as the space inside the passenger compartment excluding the space enclosed by the
ducting in the HVAC module.
\2\ Free space is defined as the space inside the passenger compartment excluding the space enclosed by the
ducting in the HVAC module.

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