



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
AIR AND RADIATION

Mr. Gary Lindgren
Mr. Don Harkins
OZ Technology, Inc.
North 10900 Howell Road
Rathdrum, Idaho 83858
November 13, 1998

Registered mail; return receipt requested

Dear Mr. Lindgren and Mr. Harkins:

This is in response to your Petition dated May 1, 1998, requesting that the Environmental Protection Agency (EPA) change the status of Hydrocarbon Blend B under EPA's Significant New Alternatives Policy (SNAP) program from unacceptable to acceptable. Based on our reading of the Petition, it appears that OZ Technology, Inc. ("OZ") is only requesting a change in SNAP status with respect to the use of Hydrocarbon Blend B in new refrigeration and air-conditioning equipment, but not in retrofitted equipment. In reviewing this Petition, EPA considered the documents attached to the Petition as exhibits, as well as all information previously submitted, regarding Hydrocarbon Blend B. OZ should also interpret this response to incorporate EPA's responses dated July 25, 1995, and August 30, 1996, to OZ's two earlier Petitions.

For the reasons stated in the enclosure, EPA is denying this Petition. In summary, none of the documents submitted as part of this Petition adequately addresses the use of Hydrocarbon Blend B as a CFC-12 substitute in new equipment. As the EPA has stated in its responses to the previous Petitions submitted by OZ, levels of risk posed by flammable refrigerants can only be assessed through a scientifically valid, comprehensive risk assessment. Such an assessment must accurately reflect potential leak scenarios, potential ignition sources, the likelihood of ignition, the consequences of ignition or explosion, and potential measures to mitigate the risk. It also must address risks specific to particular refrigeration and air-conditioning end-uses involving different charge sizes and system designs. Without a valid assessment, no reliable judgments can be made about the actual risk that flammable refrigerants pose to people using them.

A comprehensive response to each of the paragraphs contained in the Petition is enclosed. If you have any questions about this response or EPA's determinations, please contact Jeff Cohen, Chief, Analysis and Review Branch, Stratospheric Protection Division. Mr. Cohen supervises the Significant New Alternatives Policy (SNAP) program. He may be reached at (202) 564-0135.

Sincerely,

Robert Perciasepe
Assistant Administrator

Enclosure

ENCLOSURE

This Enclosure responds to the Petition submitted by OZ Technology, Inc. ("OZ") on May 1, 1998, entitled "Petition Pursuant to Section 612(d) of the 1990 Amendments to the Clean Air Act to List Hydrocarbon Blend B Refrigerants on the List of Acceptable Refrigerants for Use in Original Equipment" ("Petition").

Note that despite the fact that the language of Paragraph 12 can be interpreted to make a broader request -- that the Environmental Protection Agency (EPA) changes the status of Hydrocarbon Blend B under EPA's Significant New Alternatives Policy (SNAP) program from unacceptable to acceptable, in all end-uses -- EPA will not address in this response use of Hydrocarbon Blend B in retrofitted equipment, since both the title and the first (unnumbered) paragraph of the Petition refer only to original equipment. In addition, note that EPA reviewed the exhibits to the Petition only with respect to how the information presented in the exhibits would apply to the use of Hydrocarbon Blend B in original equipment.

The Petition refers to the original determination to list Hydrocarbon Blend B as unacceptable in new refrigeration and air-conditioning end-uses. This original determination was only made within the refrigeration and air-conditioning sector, and did not include industrial process refrigeration. In the interest of clarity and brevity in this response, Hydrocarbon Blend B may simply be referred to as "unacceptable" without repeatedly stating the qualifications mentioned above. The term "unacceptable" should be taken to mean "Hydrocarbon Blend B is unacceptable as a CFC-12 substitute for all refrigeration and air-conditioning end-uses other than industrial process refrigeration." Since the SNAP rule does not regulate the legitimate substitution of Hydrocarbon Blend B for first generation non-ozone-depleting substances, the terms "acceptable" and "unacceptable" have no bearing on such use of Hydrocarbon Blend B.

Please note that in this response, the trade name of the product marketed by OZ will be referred to as HC-12a rather than HC-12a®, since the Petition itself does not employ the use of a registered trademark in describing the product, with the exception of two references to the product in Paragraphs 1 and 6 of the Petition.

Paragraphs 1-4

These paragraphs simply describe OZ, the history of EPA's SNAP program, and the filing of the Petition, and, therefore, require no response.

Paragraph 5

EPA disagrees with several clauses contained in Paragraph 5. First, Paragraph 5 states that Hydrocarbon Blend B is a chemical composition defined by its patent in the United Kingdom (U.K.). It is EPA's position that Hydrocarbon Blend B is not defined by a U.K. patent. As stated in an August 17, 1998, electronic mail message from Christine Dibble, U.S. EPA, to Don Harkins, OZ Technology, EPA's SNAP program does not define a refrigerant blend determined to be acceptable or unacceptable under SNAP according to the description of that refrigerant under a foreign patent, or even a United States (U.S.) patent. (Note also that the U.K. patent is granted for a refrigeration *system*, rather than for the refrigerant itself). Instead, as stated in a February 1996 notice published in the Federal Register (61 FR 4736), EPA

“generally follows similar guidelines used by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE). When new blends are submitted to ASHRAE for classification, the manufacturer must specify blending tolerances. Any blend that falls outside those tolerances is defined to be a distinct refrigerant. EPA requires leak testing of blends to determine whether they can become flammable after fractionation. The percentage of flammable components in a blend are usually quite close to the maximum possible for the blend as a whole to remain nonflammable. Even an increase of 1% of a flammable component may change the flammability of the blend. Therefore, blending tolerances are smaller for flammable components than for nonflammable components. Companies should determine blending tolerances. If the outside range of those tolerances could result in a different flammability or toxicity profile, then the blend will require a new submission.”

EPA recognizes tolerances that are consistent with ASHRAE practices for establishing tolerances. As shown in ASHRAE Standard 34, Table 2 (Data and Safety Classifications for Refrigerant Blends), the maximum composition tolerance recognized by ASHRAE for a single chemical component within a refrigerant blend has been $\pm 2\%$.

Second, EPA no longer recognizes the product that is currently being marketed as HC-12a as having the chemical composition that was submitted to EPA’s SNAP program as the refrigerant blend Hydrocarbon Blend B. As set forth in an August 17, 1998, electronic mail message from Christine Dibble, to Don Harkins, OZ Technology, EPA came to this conclusion after the U.S. Department of Transportation (DOT) denied OZ’s right to transport the blend marketed as HC-12a in DOT specification 2Q containers. OZ then submitted to DOT an application to obtain a DOT exemption 12053-N, so that OZ could continue to transport the blend marketed as HC-12a in these containers. However, the percentages of chemicals in the blend submitted by OZ to DOT, in connection with the application for this exemption, are significantly different from the percentages of chemicals in the blend submitted under the SNAP program as Hydrocarbon Blend B, so much so that EPA does not believe that the blend that is being marketed as HC-12a is in fact Hydrocarbon Blend B. In addition, DOT denied the original 12053-N exemption from OZ due to the fact that the chemical composition of the submitted blend exhibited vapor pressures inappropriately high for use in a 2Q container. DOT later granted the exemption to OZ for yet a third blend of these hydrocarbons, a blend that varies from the percentages of hydrocarbons in what was submitted as Hydrocarbon Blend B by significantly more than $\pm 2\%$. The blend that is currently marketed as HC-12 and is currently packaged in DOT-approved 2Q containers, therefore, would not meet ASHRAE guidelines for being within Hydrocarbon Blend B tolerances and does not meet EPA’s definition for what constitutes Hydrocarbon Blend B.

Paragraph 6

EPA does not recognize that the Petition was filed on behalf of other manufacturers of Hydrocarbon Blend B, since no manufacturers other than OZ signed the Petition. In addition, the products referred to in Paragraph 6 as “Care 30,” “Greenfreeze,” “EC-12a,” and “ER12” have not been submitted to the SNAP program as having the same composition as Hydrocarbon Blend B. EPA, therefore, has no assurances that they are in fact the same as Hydrocarbon Blend B and does not recognize them as Hydrocarbon Blend B. For regulatory purposes, these products are not considered to have been submitted under SNAP and, therefore, may not be used as substitutes for ozone-depleting chemicals in the U.S.

Paragraph 7

This statement is somewhat misleading. Hydrocarbon Blend B has never, to the EPA's knowledge, been marketed under the term "Hydrocarbon Blend B." Instead, certain products that may or may not have the same chemical composition as Hydrocarbon Blend B have been marketed in commerce as non-ozone-depleting, second generation replacements for first generation non-ozone-depleting CFC alternatives in refrigeration and air-conditioning systems.

In addition, HC-12a has in the past been marketed as a first generation replacement for CFC-12, as well as a second generation replacement for CFC-12. OZ has in the past distributed a brochure titled "HC-12a: Natural Organic Refrigerant" that included references to CFC-12. Specifically, in the original brochure's step-by-step guide for charging a system with HC-12a, step one referred to removing CFC-12 from the system. In addition, one version of this brochure listed CFC-12 properties in a table titled "Technical Summary of Refrigerant Properties," and a graph labeled "HC-12a: Vapor Pressure vs. Temperature" included a curve for CFC-12. On the basis of this evidence, EPA concluded that HC-12a was being marketed as a CFC-12 substitute and notified OZ on July 31, 1994, that it was required to submit information on HC-12a for review under EPA's SNAP program. In addition, EPA has received numerous examples of HC-12a being marketed as a direct first-generation replacement for CFC-12 in motor vehicle air-conditioning systems.

Note that EPA did not publish any final SNAP rule on April 1, 1994. OZ may be referring to the final SNAP rule published on March 18, 1994, at 59 FR 13044, effective on April 18, 1994.

Paragraph 8

To the extent Hydrocarbon Blend B is used to replace non-ozone-depleting first-generation substitutes, EPA does not control such use. However, EPA does regulate the use of Hydrocarbon Blend B as a second-generation substitute for ozone-depleting first-generation substitutes.

Paragraph 9

EPA agrees with OZ that Hydrocarbon Blend B is non-ozone-depleting, contributes negligibly to global warming, and exhibits a toxicity that is acceptably low. However, OZ's statement that Hydrocarbon Blend B "has a scientifically proven and field experience supported limited potential for flammability" mischaracterizes the nature of the flammability characteristics of Hydrocarbon Blend B. As stated in EPA's SNAP rule dated June 13, 1995, (60 FR 31092), Hydrocarbon Blend B

"readily ignites at room temperature in the presence of a spark or a flame. No report has supported the notion that this blend must be heated to very high temperatures before it will propagate a flame. As stated in the SNAP FRM on March 18, 1994, EPA requires a comprehensive, scientifically valid risk assessment if a refrigerant is flammable, and no such study has been performed. EPA, therefore, maintains its position that Hydrocarbon Blend B is unacceptable as a substitute for CFC-12 in automobiles and several other end-uses."

In addition, there is no reason to expect that Hydrocarbon Blend B's flammability characteristics differ from that of its individual hydrocarbon components. All of these substances have been designated as "flammable" by Underwriters Laboratories (UL) and by ASHRAE. While Paragraph 9 characterizes Hydrocarbon Blend B as having a "limited potential for flammability," the document presented by OZ in Exhibit C, British Standard 4434, classifies all of the primary hydrocarbon components in Hydrocarbon Blend B as being in the A3 safety group, and describes A3 refrigerants as "highly flammable and potentially explosive." Moreover, DOT's Office of Defects Investigation (ODI) conducted an initial study of the flammability risk associated with the use in unmodified, existing automobiles of OZ-12, a hydrocarbon blend manufactured by OZ similar in composition to Hydrocarbon Blend B and also listed as unacceptable under SNAP for most refrigeration and air-conditioning end-uses. The result of this study was a December 30, 1993, letter from DOT to OZ that stated: "ODI believes there is an unacceptable fire risk associated with the use of OZ-12 in a conventional motor vehicle. Accordingly, we request that you initiate a safety recall concerning this matter." Again, no evidence suggests that Hydrocarbon Blend B is less flammable than OZ-12, or that using Hydrocarbon Blend B in a system would pose less risk than using OZ-12.

Paragraph 9 contains the statement that Hydrocarbon Blend B is “entitled” under SNAP to be listed as acceptable under the SNAP program as a substitute for class I and class II refrigerants, in new equipment, in all refrigeration and air-conditioning end-uses. EPA encourages OZ to submit a comprehensive, scientifically valid assessment that addresses risks to persons potentially exposed to Hydrocarbon Blend B for each specific end-use. Upon EPA’s receipt of such an assessment, EPA will reconsider its unacceptability determination for that particular end-use. As discussed above, and previously affirmed in responses to two earlier Petitions (notices of which were published in the Federal Register on September 25, 1995, at 60 FR 49407, and on September 30, 1996, at 61 FR 51018), no such study or assessment has been submitted to EPA for a specific end-use.

Paragraphs 10 and 11

In Paragraph 10, OZ refers to the documents listed in Exhibit B to the Petition as evidence that Hydrocarbon Blend B should be listed as acceptable under SNAP as a replacement refrigerant in new refrigeration and air-conditioning equipment. The title of Exhibit B is “Listing of previously submitted safety and risk assessment tests and reports in support of HC Blend B refrigerants to replace ODPs.” EPA interprets this title, together with the language of Paragraph 11 of the Petition, to mean that, with the exception of the documents listed in Paragraph 11, all of the documents listed in Exhibit B have been previously submitted by OZ to EPA in the past. As stated above, EPA has not received from OZ or from any other source any document which EPA considers to be a comprehensive, scientifically valid risk assessment that examines the potential for risk of using Hydrocarbon Blend B in a particular refrigeration or air-conditioning end-use.

EPA has reviewed the documents described below and has concluded that none of them constitutes a risk assessment necessary to list a chemical or blend substitute as an acceptable substitute refrigerant under SNAP. None quantifies, using existing data and supportable assumptions, the risk to human health posed by the use of Hydrocarbon Blend B for any particular refrigeration and/or air-conditioning end-use, taking into account various combinations of leak scenarios, ignition sources, their respective probabilities, and other criteria described in this Enclosure. For example, none of the documents discusses charge size, a key variable in the estimation of flammability risk. Large cars can contain twice as much refrigerant as small cars. Similarly, large U.S. refrigerators contain much more refrigerant than small European models. A larger refrigerant charge means that a higher concentration in air is created by a given leak, and the leak will last longer. In addition, for a given volume, like the inside of a car, it is possible that a small charge would not create a flammable mixture, but a typical or larger charge could. A comprehensive risk assessment must address these differences.

System specifics are also a key variable in a comprehensive risk assessment. Even within a specific end-use, differences in design can yield differences in risk. For example, the smaller size of European refrigerators means not only that the refrigerant charge is smaller, but also that the physical size of the system is smaller, which could have an effect on where it is placed in a kitchen. Also, U.S. refrigerators generally have automatic defrost heaters (a potential ignition source), whereas many European models do not. In cars, certain models may provide for continuous fresh air flowing through the passenger compartment, whereas others may not. A secondary loop can greatly reduce flammability risk in a supermarket refrigeration system, even though the system still falls into the retail food refrigeration end-use. Such design differences can have large impacts on overall flammability risk. Therefore, risk assessments must reflect system specifics.

It is inappropriate to extrapolate from one end-use to another, or from one refrigerant to another. End-uses differ greatly in operating conditions. For example, automobiles are driven at high speeds and frequently collide with each other and other objects. The condenser on automobiles is immediately behind the grille, where it is highly susceptible to puncture during a front-end collision. Refrigerators, in contrast, operate in an environment that features numerous internal and external ignition sources, including door light switches, automatic defrost heaters, potentially faulty wiring, gas ranges, and cigarette lighters. Subjective measures, experiments that do not reflect actual systems, and unsubstantiated observations do not allow a credible estimate of risk posed by the flammability of Hydrocarbon Blend B.

A. **British Standard 4434, Safe Methods for Using Environmentally Friendly Refrigerants, with amendments through March, 1997 (Exhibit C to the Petition).**

British Standard 4434 is a 1995 revision of a previous British specification for safety and environmental aspects in the design, construction and installation of refrigerating appliances and systems. The 1995 revision takes into account the proposed content of prEN 378, a European safety standard for refrigerants. BS 4434 is designed to apply to any refrigerating system in which the refrigerant is evaporated and condensed in a closed circuit, including heat pumps and adsorption systems, but excluding systems using air as the working fluid. BS 4434 shows how refrigerants, including CFCs, HCFCs, HFCs, PFCS and hydrocarbons, are classified according to their flammability and describes which refrigerants (according to their safety group as determined by flammability and toxicity) may be appropriate for which types of cooling systems (e.g., direct, indirect, indirect vented closed, and double indirect systems). Note that all of the primary chemicals in Hydrocarbon Blend B are classified in the A3 safety group, and that section 2.2.2 of BS 4434 describes A3 refrigerants as “highly flammable and potentially explosive.”

BS 4434 also specifies allowable pressures that system components must conform to in order to meet BS 4434; describes requirements for installing the refrigeration and air-conditioning systems; lists testing, inspection, documentation and marking requirements; and requires that the supplier or manufacturer of the equipment shall provide an instruction manual.

BS 4434 is not a comprehensive, scientifically valid risk assessment that examines the potential for risk of using Hydrocarbon Blend B in any particular refrigeration or air-conditioning end-use. The fact that BS 4434 addresses specific types of cooling systems that correlate to particular refrigeration and air-conditioning end-uses does not in and of itself make BS 4434 a risk assessment. For example, there is no discussion in BS 4434 of the probability of various types of refrigerant release, the types of ignition sources and their likelihood, or the probabilities of ignition occurring near a flammable mixture of Hydrocarbon Blend B and air. Rather, BS 4434 is a voluntary industry standard, comparable in many respects to the combination of ASHRAE Standard 15, Safety Code for Mechanical Refrigeration, and ASHRAE Standard 34, Designation and Safety Classification of Refrigerants. These standards are nationally recognized in the U.S. as the primary standards that refrigerating appliances and systems should meet; in addition, many U.S. states have incorporated one or both ASHRAE standards into their building codes.

In order to list a chemical or blend refrigerant as an acceptable substitute refrigerant under SNAP, EPA requires the submission of a risk assessment that quantifies, using existing data and supportable assumptions, the risk to human health and property posed by the use of the chemical or blend, taking into consideration various combinations of leak scenarios, ignition sources, and their respective probabilities. Additional criteria are described on page 13 of this Enclosure. BS 4434 does not meet these requirements and the EPA believes that Standard 4434 should not form the basis of U.S. government policy.

Note that Underwriters Laboratories (U.L.) is working on new standards that are relevant to U.S. refrigeration and air-conditioning systems. (See EPA's response to Paragraphs 12-15 for more detailed information on the potential to use safety standards in lieu of risk assessments). EPA believes that standards established by U.L. and other U.S. standard-setting organizations that have the best understanding of safety issues relevant to U.S.-manufactured appliances and systems, and of the appropriateness of applying safety standards to those appliances and systems, can form the basis of U.S. government policy.

A. Code of Practice for the Use of Hydrocarbon Refrigerants in Motor Vehicle Air Conditioning, The Independent Australian Hydrocarbon Refrigeration Association (IAHRA), November, 1996 (Exhibit D).

This Code of Practice is a 1996 document published by IAHRA, an organization established by the hydrocarbon refrigerant industry in Australia, and purports to be the result of consultation between that industry and the Australian government. The Code is aimed only at the use of hydrocarbons in motor vehicles, and contains only a minimum working standard for automotive service technicians' handling of air-conditioning systems that contain hydrocarbons. The Code's purposes are to ensure the safety of vehicle passengers, technicians servicing the vehicle, or any other persons who may work on the vehicle; to minimize the loss of hydrocarbons during the life of the motor vehicle air-conditioning system; and to minimize the loss of other refrigerants when a vehicle is converted from their use to using hydrocarbons. In order to meet the Code, automotive technicians servicing vehicles that contain hydrocarbon refrigerants must

hold a certificate of competency in the use of these refrigerants which is recognized by IAHRA. The Code describes the proper means of evaluating an air-conditioning system prior to service, necessary equipment to be kept in the workshop, recommended work practices, and requirements for labeling the system. The Code also prescribes specification tolerances for what constitutes pure hydrocarbon refrigerant.

As in the case of British Standard 4434, however, the Code of Practice is not a comprehensive, scientifically valid risk assessment that examines the potential for risk of using Hydrocarbon Blend B in a particular refrigeration or air-conditioning end-use. The fact that the Code of Practice addresses one specific refrigeration and air-conditioning end-use does not in and of itself make the Code of Practice a risk assessment. For example, there is no discussion in the Code of the probability of various types of refrigerant release, the types of ignition sources and their likelihood, or the probabilities of ignition occurring near a flammable mixture of Hydrocarbon Blend B and air. Rather, it is a voluntary industry standard, comparable to the training and testing mandated under Section 609 of the Clean Air Act that U.S. automotive technicians must receive and pass if they wish to service air-conditioning systems in the course of their work. The IAHRA Code of Practice would potentially be useful in determining appropriate conditions on the use of hydrocarbon refrigerants in newly manufactured motor vehicles, but as previously stated, Hydrocarbon Blend B is not listed as acceptable under SNAP in that end-use.

B. Test Report E95/0581, Safety in Mines Testing and Research Station (SIMTARS), November 15, 1995 (Exhibit E).

The materials provided in Exhibit E did not identify SIMTARS, so it is unknown if SIMTARS is a division of the Australian government or is a privately owned testing center. The Test Report, which is dated November 15, 1995, compares HC-12a and R-134a with respect to their (1) spark energies required for ignition, and (2) auto-ignition temperatures. The Report describes the testing methodologies and concludes as follows:

- (1) both propane (a reference gas for the test) and HC-12a, when mixed in the same proportions in air (5.2% by volume), ignited at 250 and 300 microJoules of energy, but not at 96 microJoules;
- (2) the R-134a did not ignite at any of these energy levels;
- (3) when mixed in the same proportions in air as propane was mixed in air, the HC-12a ignited at virtually the same temperature as propane; and
- (4) when the R-134a was mixed with air, it could not be ignited at any refrigerant/air concentration tested, at a temperature of 1040 degrees C maintained for 60 seconds.

Exhibit E also includes other test results from SIMTARS that evaluate the flammability limits of HC-12a, compared with the limits for commercial grade liquefied petroleum gas (LPG).

The materials in Exhibit E do not constitute a comprehensive, scientifically valid risk assessment that examines the potential for risk of using Hydrocarbon Blend B in a particular

refrigeration or air-conditioning end-use. Instead, these materials only serve to confirm well-established data concerning flammability limits and auto-ignition temperatures of hydrocarbons and R-134a. These flammability data, for example, agree with the data shown in Table 2, Classification of Refrigerants, of British Standard 4434 (Exhibit C). In addition, the test results clearly indicate the flammability of HC-12a, again confirming the potential flammability risk of Hydrocarbon Blend B and the necessity of conducting a risk assessment.

C. Refrigerant Concentrations in Car Passenger Compartments, Dr. Ian Maclaine-cross, University of New South Wales, Sydney, Australia, November 1997 (Exhibit F).

Exhibit F is missing from the Petition. EPA, therefore, cannot comment on Exhibit F.

Vapor Pressure/Temperature Curve Comparison of Hydrocarbon Blend B, HFC-134a, and R-12 (Exhibit G).

As in the case of the materials in Exhibit E, the chart shown in Exhibit G does not constitute a comprehensive, scientifically valid risk assessment that examines the potential for risk of using Hydrocarbon Blend B in a particular refrigeration or air-conditioning end-use. Instead, the chart only confirms well-known information concern the relationship between pressures and temperatures for the refrigerants shown.

Paragraphs 12-15

In Paragraph 12, OZ requests that EPA take Hydrocarbon Blend B off the list of unacceptable substitutes for all refrigeration and air-conditioning end-uses, and that EPA list Hydrocarbon Blend B as acceptable in those end-uses. EPA concludes given the title and the language set forth in the first (unnumbered) paragraph of the Petition, that this request applies only to new equipment. Paragraph 12 states that OZ requests that EPA, in its response, cite and implement the EPA guidelines set forth within the Advanced Notice of Proposed Rulemaking (ANPRM) for the SNAP program at 57 FR 1984 (January 16, 1992). This ANPRM described and invited comment on a preliminary strategy for implementing section 612 of the Act. The specific ANPRM sections cited by OZ in Paragraph 12 describe the preliminary proposed requirements of the SNAP program, the preliminary proposed guiding principles underlying the SNAP program, and EPA's preliminary proposed objectives in conducting initial risk characterizations of substitutes then known to the EPA. Because the text of the ANPRM is not equivalent to the preamble language or regulatory text set forth in a final EPA regulation, EPA has no obligation to implement specific provisions of the ANPRM, or to justify the EPA's decision today in light of ANPRM provisions.

OZ's request is denied. In order to list a chemical or blend refrigerant as an acceptable substitute refrigerant under SNAP, EPA requires the submission of a risk assessment that quantifies, using existing data and supportable assumptions, the risk to human health and property posed by the use of the chemical or blend, taking into consideration various combinations of leak scenarios, ignition sources, and their respective probabilities, as well as the additional criteria described in this Enclosure. EPA has not received such an assessment that examines the potential for risk of using Hydrocarbon Blend B in any refrigeration or

air-conditioning end-use for which OZ is seeking a determination of acceptability. EPA welcomes the submission of such an assessment.

Note that with respect to refrigeration and air-conditioning end-uses that involve new, rather than retrofitted, equipment, EPA believes that the submission of a comprehensive risk assessment may not be necessary in the event that there exists a nationally recognized U.S. industry standard that adequately protects both consumers and service and disposal personnel. In the event of the existence of such a standard designed to address the use of hydrocarbons in a specific new refrigeration or air-conditioning end-use, EPA could issue a notice-and-comment rulemaking that would propose listing hydrocarbons as acceptable if they are used in equipment that meets the standard.

In Paragraph 13, OZ requests that EPA review the Petition in light of a statement made by EPA policy analyst Jeffrey Levy in November, 1997 that “EPA is planning to amend the rules to allow the legal use of HCs in original equipment that is designed to accommodate them.” EPA indeed is considering issuing a proposed regulation that would list hydrocarbons as acceptable substitutes for CFC-12 in one particular end-use only – new household refrigerators and freezers. This proposal will most likely apply only to those makes and models that have been certified by an EPA-approved standards testing organization to meet Underwriters Laboratories Standard 250, Standard for Safety: Household Refrigerators and Freezers, Tenth Edition, as amended by a supplement to be published in November 1998. This supplemented edition of UL 250 provides for protective design features for refrigerators and freezers that use flammable refrigerants. Specifically, in the supplemented edition of Standard 250,

- charge limits are set according to the refrigerant’s flammability characteristics (in particular, the heat of combustion);
- the worst-case fractionated composition for a blend is used to determine the charge limit;
- several specific design criteria are included to minimize the likelihood of leakage leading to ignition, such as the elimination of dead spaces, protection of refrigerant tubing, and welded joints; and
- specific markings are required to alert consumers and service and disposal personnel of the presence of a flammable refrigerant.

EPA plans to have this proposed regulation published in spring 1999.

In response to Paragraph 14 of the Petition, EPA continues to agree with all of the cited statements, which were originally made in the August 30, 1996, denial of a previous Petition submitted by OZ. EPA believes hydrocarbons may be viable alternative refrigerants for new systems. New systems can be designed to adequately address the risk of using flammable refrigerants. EPA has consistently supported the responsible development of hydrocarbon refrigerants in refrigeration and air-conditioning end-uses. However, *responsible* development entails following the requirements that EPA has outlined in this Petition response and in its previous responses to OZ Petitions: that for each refrigeration and air-conditioning end-use, a comprehensive risk assessment must be submitted or a nationally recognized U.S. industry standard that is designed to address the use of hydrocarbons in new equipment must exist. In the absence of either such a risk assessment or such an industry standard, EPA will continue to find that hydrocarbons are unacceptable as substitutes for ozone-depleting substances in those end-uses.

EPA disagrees with the statements made in Paragraph 15. The EPA does not believe that the acceptability of Hydrocarbon Blend B under SNAP is critical to original equipment manufacturers' (OEMs') development of systems to use it. EPA regulations include a specific exemption from the SNAP submission requirements for substitutes that are produced for the purpose of conducting research and development.

Paragraphs 16-17

EPA's response to the exhibits attached to the Petition is set forth in the discussion of Paragraphs 10 and 11 of the Petition above. EPA does not dispute that Hydrocarbon Blend B is non-ozone-depleting and low in global warming potential, and that its toxicity is not a concern at exposure levels anticipated in the relevant end-uses. However, none of the exhibits attached to the Petition demonstrates that Hydrocarbon Blend B poses an acceptably low risk of

accident, injury, or personal property damage when used in a particular refrigeration or air-conditioning end-use. None of the exhibits, for example, considers various combinations of leak scenarios in specific end-uses, ignition sources, or their respective probabilities. In addition, none of the exhibits is a nationally recognized U.S. industry standard that is designed to address the use of hydrocarbons in new equipment in a specific refrigeration or air-conditioning end-use.

Paragraph 18

This paragraph requests that upon approval of the Petition by EPA, the acceptance of Hydrocarbon Blend B under the SNAP program be conditioned upon “certification by industry, government or trade organizations in accordance with existing refrigerant substance certification procedures.” Since EPA is denying the Petition, this paragraph requires no response.

Paragraph 19

Paragraph 19 requests that EPA respond to the Petition within ninety (90) days. Due to resource constraints and EPA staff work load, EPA has exceeded this time frame. However, with this response, the EPA has made every effort to thoroughly review and acknowledge the Petition in a timely manner.

Paragraph 20

In this paragraph, OZ “declares” that EPA’s response to the Petition should include a comprehensive risk characterization conducted and prepared by EPA. The EPA assumes that OZ is referring to a risk characterization that justifies the EPA’s decision to list Hydrocarbon Blend B as an unacceptable substitute in all refrigeration and air-conditioning end-uses, retrofitted and new, other than industrial process refrigeration.

Under the SNAP program, EPA may determine that a proposed substitute is unacceptable for use in a specific refrigeration or air-conditioning end-use unless the submitter or another organization conducts and provides to the EPA a comprehensive risk assessment that demonstrates that the proposed substitute may be safely used. EPA may also have in its possession other information that demonstrates to the EPA’s satisfaction that the proposed substitute may be safely used. EPA, however, is under no obligation to conduct its own assessment in order to determine that a proposed substitute should be listed as either acceptable or unacceptable. In this instance, EPA has no duty to conduct and prepare a comprehensive risk characterization, as OZ seems to imply. Rather, it is incumbent upon OZ to demonstrate, for each proposed end-use, that Hydrocarbon Blend B or any other submitted refrigerant may be used safely. OZ should also refer to EPA’s response to Paragraphs 17 and 18 of OZ’s December 15, 1995, Petition.

Paragraph 21

Paragraph 21 requests that a denial of the Petition be accompanied by an explanation of the EPA’s decision. This document provides a full explanation of EPA’s denial of the Petition. EPA will add this response to the public docket for the SNAP rule. In addition, EPA will publish a Notice in the Federal Register alerting the public that the response exists and explaining how to obtain a copy of the response from the docket or from EPA's world wide web site.

In this paragraph, OZ also requests that such an explanation be accompanied by the following statements:

- *Hydrocarbon Blend B may still be marketed as a second generation substitute for ozone-depleting substances for use in refrigeration and air-conditioning systems.*
- The SNAP rule does not regulate the legitimate substitution of Hydrocarbon Blend B for first generation non-ozone-depleting substances. It is not EPA's role to promote a specific product, nor to make declarations concerning the regulation of Hydrocarbon Blend B by other jurisdictions. It should be noted that other federal statutes, or state or local authorities, may regulate the marketing of Hydrocarbon Blend B in particular refrigeration or air-conditioning end-uses.
- *EPA will amend any documents made available to the public to reflect the legal status of Hydrocarbon Blend B as a second generation substitute.* EPA does not have the ability to amend all documents the EPA makes available to the public to include this information. For example, there may be documents available in the public docket that are not EPA documents, but that are made available to the public by EPA. In addition, EPA makes many documents available to the public that may list or otherwise mention Hydrocarbon Blend B but that do not generally discuss the legal status of refrigerants. The EPA has, however, already updated EPA fact sheets concerning hydrocarbons to reflect the legal status of Hydrocarbon Blend B as a second generation substitute. For example, one fact sheet contains the following question and answer:

“Is it legal to replace HFC-134a in a motor vehicle with hydrocarbon refrigerants such as DURACOOOL 12a® and HC-12a®?”

“In certain circumstances, the replacement of HFC-134a in a motor vehicle with hydrocarbon refrigerants might be permitted. At a minimum, in order to avoid violating the Clean Air Act, the motor vehicle air-conditioning system must have either been originally designed for use with HFC-134a refrigerant, or must have been previously retrofitted from CFC-12 to HFC-134a refrigerant,

AND no sham retrofit must have occurred to convert the system to the hydrocarbon refrigerant. In order to avoid violating other laws, the replacement of the refrigerant must not violate any state or local prohibition on the use of flammable refrigerants in motor vehicle air-conditioning systems.

“The following 18 states ban the use of flammable refrigerants such as HC-12a® and DURACOOOL 12a® in motor vehicle air-conditioning, regardless of the original refrigerant: Arkansas, Arizona, Connecticut, Florida, Idaho, Indiana, Iowa, Kansas, Louisiana, Maryland, North Dakota, Oklahoma, Texas, Utah, Virginia, Wisconsin, Washington, and the District of Columbia.

“EPA and Hotline staff will not, based solely on facts given in a phone call or letter, determine the legality under the SNAP program of using a hydrocarbon refrigerant in a motor vehicle retrofitted to use HFC-134a, because the determination depends on many factors, including the nature of the retrofit from CFC-12 to HFC-134a, the reason for the retrofit, and the exact procedure and timing involved.

“If you plan to change a car from HFC-134a to a hydrocarbon refrigerant such as HC-12a® and DURACOOOL 12a®, you should consider that auto manufacturers have stated that changing the refrigerant in new vehicles designed for use with HFC-134a will void the warranty and may damage the system. If the air conditioner on a new car or truck is not working, consult a qualified mechanic or your dealer.”

EPA concludes that all references in Paragraph 21 to the “final rule of April 1, 1994,” are intended to be references to the final SNAP rule dated March 18, 1994, effective April 18, 1994.

- *EPA will instruct EPA officials and other entities empowered to disseminate refrigerant information to the public as to the correct legal status of Hydrocarbon Blend B. All EPA information concerning the legal status of Hydrocarbon Blend B is disseminated either verbally by EPA staff or by delivering a copy of EPA fact sheets concerning the use of hydrocarbon refrigerants to the requestor. EPA has consistently made every effort to distribute through EPA staff and its toll-free information hotline thorough, appropriate and accurate information to the public concerning Hydrocarbon Blend B.*
- *EPA will identify any data, tests or information, or other required criteria or risk analysis parameters, that are missing from the Petition, in order for the Petition to be granted. As the EPA has stated numerous times in this response, OZ must submit, for each separate refrigeration or air-conditioning end-use, a comprehensive, scientifically valid risk assessment that will discuss the potential for risk posed by exposures of Hydrocarbon Blend B to manufacturing, servicing, and disposal personnel, and to consumers. At a minimum, each assessment should include consideration of various combinations of leak scenarios in the end-use, all potential ignition sources, and their respective probabilities. The risk assessment must include specific data related to the use of Hydrocarbon Blend B under several scenarios, including installation, use, accidents in the case of car air conditioning, leaks in all cases, recovery, and disposal. In addition, if OZ wishes to use Hydrocarbon Blend B in new equipment, a risk assessment must address*

safety risks associated with charging, packaging, transporting, and installing such equipment. For each scenario, a risk assessment must analyze in a detailed manner the probability of various types of release, the types of ignition sources and their likelihood, the probabilities of ignition occurring near a flammable mixture of Hydrocarbon Blend B and air, and the results of an ignition or explosion. Finally, these risk assessments must explain measures to reduce any risks identified in the previous analysis. Such risk assessments are dependent on the end-use and refrigerant in question. As discussed in the response to Paragraphs 12-15, with respect to new equipment in refrigeration and air-conditioning end-uses, in the absence of an adequate risk assessment, OZ would have to submit a copy of a nationally recognized U.S. industry standard that adequately protects both consumers and service and disposal personnel.

- *EPA will identify any legislative or other regulatory authority that has been cited in denying the acceptance under the SNAP program of Hydrocarbon Blend B as an acceptable substitute for use in original equipment.* Section 612 of the Clean Air Act, which is implemented by the SNAP rule (40 CFR Part 82, Subpart G), provides the legal authority for making SNAP listing decisions. Section 612(c) requires EPA to promulgate rules making it unlawful to replace any class I or class II 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. In addition, note that as stated in the SNAP rule, "[i]f a substitute is flammable, the submitter must analyze the risk of fire resulting from the use of such a substitute and assess the effectiveness of measures to minimize such risk." 40 CFR 82.178(a)(9).

Because Hydrocarbon Blend B is flammable, EPA believes that it may present adverse effects to human health in most refrigeration and air-conditioning end-uses. It is incumbent upon anyone who disagrees with the basis for such a finding to produce evidence controverting such a determination. EPA has not received satisfactory data or an adequate risk assessment that indicate otherwise. EPA has, therefore, determined that Hydrocarbon Blend B is unacceptable for use in new equipment in refrigeration and air-conditioning end-uses.

- *EPA will provide documentation to OZ upon denial of the Petition that substitute refrigerants listed as acceptable under the SNAP program have been held to the same standards during the SNAP evaluation process.* EPA's determination as to the acceptability or unacceptability of refrigerants in particular end-uses is supported by discussion found in the final SNAP rules and Notices of Acceptability that are published in the Federal Register, and in the supporting documentation made available to the public in the docket. In the event that OZ has questions concerning the acceptability of any particular substitute refrigerant, in a particular end-use, OZ may direct such specific questions to the EPA.

OZ should also refer to EPA's response to Paragraph 21 of OZ's December 15, 1995 Petition.

Paragraph 22

Paragraph 22 is simply a reiteration that OZ believes that EPA should list Hydrocarbon Blend B as acceptable for use in all new refrigeration and air-conditioning systems. EPA has already commented on this statement elsewhere in this response.

Paragraph 23

In this paragraph, OZ requests that EPA review all of the documents attached to the Petition. EPA has reviewed them and the EPA's comments are discussed in the response to Paragraphs 10-11 of the Petition. This paragraph also requests that EPA once again review the documents provided in previous Petitions. EPA's comments to those documents are discussed in EPA's denials to OZ's previous Petitions. These denials and the accompanying documentation are located in the EPA Air Docket A-91-42, file numbers VI-C-6 and VI-C-20. EPA discussed the 1995 Arthur D. Little, Inc. report mentioned in this paragraph in extensive detail in the denial of OZ's December 5, 1995, Petition, which is located in file VI-C-20 of the docket.