



June 16, 2016

Stratospheric Protection Division
Office of Atmospheric Programs
Environmental Protection Agency
1200 Pennsylvania Ave. NW
Washington, DC 20460

Attention: Docket ID No. EPA-HQ-OAR-2015-0663

On February 1st, the Natural Resources Defense Council (NRDC) and the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) presented a letter of support for the US Environmental Protection Agency's (EPA's) Significant New Alternatives Policy (SNAP) Program to change the status of refrigerants currently approved for chillers. In that letter of support, we proposed January 1, 2025, as the end of use date for R-410A, R-407C, and HFC-134a for all types of new construction chillers, including centrifugal and positive displacement chillers used in commercial and industrial air conditioning, refrigeration, and all other applications.

Chillers provide energy efficient solutions to air condition buildings. They achieve energy savings by cooling water that is then pumped through the building to provide cooling. Chillers are designed to leak almost no refrigerant. They are installed and managed by well-trained, professional technicians and, above a certain capacity, are often assigned dedicated building engineers. These professionals ensure the chillers are operating properly and investigate problematic symptoms, including those due to refrigerant loss. With this professional support, refrigerant leaks are quickly detected and repaired to ensure proper whole-building cooling performance.

As a result, chillers have a low direct climate impact (the emission of HFCs) and indirect climate impact (the use of electricity). However, the change to lower GWP refrigerants will in general increase the cost of chillers due to the potentially higher price of the refrigerant, required redesign to maintain efficiency, and the addition of appropriate mitigation where flammable refrigerants are used.

In order to avoid a reduction in chiller market share and to maintain chillers' climate benefit in building air conditioning, NRDC and AHRI offered a change of status that would transition chillers away from high global warming potential (GWP) alternatives while ensuring manufacturers have adequate time to choose and redesign for the lowest-GWP, most energy-efficient refrigerants possible. In many cases, choosing the best refrigerants requires a more involved redesign effort that takes longer to complete than a switch to a lesser option. But the result is highly-efficient, climate-friendly chillers for as many applications as possible. Accelerating the transition to lower GWP refrigerants in chillers may result in higher than optimal costs and could cause a shift to other less-costly and less-efficient HVAC options with a negative impact on the climate.

The other major issue affecting the proposed SNAP change of status date is the development of product and application safety standards allowing the use of A2L refrigerants. Many promising alternative refrigerants are mildly flammable (especially for R-410A) and currently restricted under product safety standards and building codes. In order to use them effectively and safely, the appropriate mitigation must

be developed, proven, and finally adopted by safety standards. Only then can states and municipalities adopt building codes reflecting the updated safety standards.

Redesign Time:

Meeting the proposed date of 2025 will require a faster shift than the chiller industry faced in previous phaseouts, and includes a transition to solutions that are much more complex. The forthcoming redesign will require modification not only to the equipment itself, but also to the manufacturing environment, servicing practices and shipping logistics, and most importantly, to the equipment rooms and buildings in which these equipment may be installed.

Despite this added complexity and the significant design cost and effort involved, the HVAC&R industry has mobilized in unprecedented ways to make the 2025 date possible. This includes:

1. An open evaluation of new refrigerants through the AHRI Low-GWP AREP program, whereby performance comparisons were published for all manufacturers to use when evaluating climate-friendly options
2. Codes and standards working groups in which manufacturers, producers, industry association, and EPA have an opportunity to discuss how to accelerate the update of safety standards and accelerate the revision of building codes to make climate-friendly technologies viable
3. The pledge of over \$5 million by AHRI, ASHRAE and the Department of Energy (DOE) to fund independent, 3rd-party, peer-reviewed research to develop safe application and product standards for mildly flammable refrigerants
4. An industry effort to develop a global refrigerant management plan and safe-service procedures for technicians
5. Industry company-funded research and testing to develop standards and codes based on physics-based modeling and confirmation testing for the safe use of A2L refrigerants

By finalizing changes of status in 2025, EPA would encourage this type of proactive industry engagement in this refrigerant transition.

Codes and Standards:

For scroll chillers that currently use R-410A and R-407C, several low-GWP options actually have higher energy efficiency and equal or better capacity compared to their predecessors. However, they pose a significant challenge that the chiller industry has not previously faced: all high-pressure alternatives have mild flammability—ASHRAE 2L class. These also will require redesign and optimization to ensure proper lubrication systems are developed, qualified, and optimized for the new alternative refrigerants.

Even with additional funding for research and efforts to accelerate the process, product and safety standards will not be updated until 2018 at the earliest. Model building codes, adopted or used by most states and municipalities, are expected not to reflect those changes until 2021. Many states and municipalities will then need to update their codes to the latest standards—something they historically have not been prompt in doing. This type of delay could dramatically reduce the number of markets in which chillers using climate-friendly refrigerants can be competitive in the years following SNAP's change of status.

EPA has the opportunity to ensure that it provides sufficient time to mitigate these concerns and that no adverse climate impacts come of the forthcoming change of status for refrigerants used in chillers. Finalizing a change of status date of January 1, 2025, will codify a hard-earned agreement between

industry and advocates and pave the way towards a responsible transition out of HFCs in building air conditioning applications and beyond.

A handwritten signature in black ink that reads "David Doniger". The script is fluid and cursive, with the first name and last name clearly distinguishable.

David Doniger
Director, Climate & Clean Air Program
Natural Resources Defense Council

A handwritten signature in black ink that reads "Stephen R. Yurek". The signature is highly stylized and cursive, with a large, sweeping initial 'S'.

Stephen R. Yurek
President and CEO
Air-Conditioning, Heating, and Refrigeration Institute