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March 19, 2018

Ms. Pamela Gupta, Manager  
Greenhouse Gas Reduction Strategy Section  
Research Division  
California Air Resources Board  
1001 I Street  
Sacramento, CA 96814

Re: Proposed Regulation: Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration and Foam End-Uses.

Dear Ms. Gupta:

I am the Vice President of Legal & Regulatory for Hudson Technologies Company (“Hudson”) and am respectfully submitting the following comments to the California Air Resources Board’s (“CARB”) proposed regulation entitled “Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration and Foam End-Uses” (hereinafter “SNAP Replacement Rule”). In this regard, I refer you to our comment letter, dated November 11, 2017, submitted following CARB’s October 24, 2017 workshop on regulatory proposals to reduce emissions from high-global warming potential (GWP) refrigerant and foam end uses.

Hudson is the nation’s largest refrigerant reclamation company. While our main reclamation facility is in Champaign, Illinois, we also have facilities in Escondido, California and Ontario, California. For more than 25 years, we have purchased used refrigerants and reclaimed the refrigerant so it can be reused to service the aftermarket. Reclamation has substantial environmental and economic benefits. It dramatically reduces direct and indirect emissions to the atmosphere, both by limiting the amount of virgin gas that must be produced and by creating economic incentives to ensure refrigerant is handled properly and leaks are minimized. In addition, reclamation can play a critical role in reducing costs and increasing flexibility for owners of legacy equipment as they transition towards new lower-GWP equipment.

CARB’s proposed SNAP Replacement rule would adopt specific prohibitions for certain hydrofluorocarbon (“HFC”) substitutes in refrigeration and foam end-uses, previously promulgated at the national level by the US EPA under its Significant New Alternatives Policy (“SNAP”) program but later vacated by the U.S. Court of Appeals for the D.C. Circuit, with the goal of making progress towards California’s 2030 greenhouse gas reduction targets. Hudson wholly supports CARB’s efforts to address the growing concern with emissions of high-GWP refrigerant. However, as Hudson emphasized in our comments submitted to EPA in connection with its SNAP Rules 20 and 21, utilizing SNAP-type regulations to prohibit high GWP refrigerants for use in specific equipment is at best a small half measure; such rules, standing alone, cannot and will not materially reduce refrigerant emissions and venting without a corresponding phase-out of virgin production and/or supply of high-GWP refrigerants, together with robust policies to promote the use of reclaimed refrigerants. Further, CARB’s proposed SNAP Replacement Rule does not

provide comprehensive coverage of end-uses (notably with regard to air conditioning) and treats substitute refrigerants inconsistently, prohibiting use of some HFCs while allowing continued use of others that have similar or higher GWPs. A more comprehensive approach could provide deeper real-world emission reductions at similar or lower cost.

Hudson therefore urges CARB to adopt the following policies (explained in greater detail below), some of which are applicable to this rulemaking and some of which would need to be addressed more fully in subsequent proceedings:

1. In the proposed SNAP Replacement Rule and any subsequent SNAP-type rules, CARB should prohibit the use of previously approved HFC substitutes in existing equipment. This will incentivize the use of reclaimed refrigerants for such equipment, which will reduce use of higher-GWP substitutes, minimize the need for additional virgin production, and significantly reduce venting and emissions.
2. The proposed SNAP Replacement Rule should be expanded, or supplemented, with a follow-on rulemaking as quickly as possible, to comprehensively and consistently address all end-use sectors. Significantly, the residential and commercial AC sectors, which together represent approximately 60% of the market, are not addressed in the proposal.
3. Most important, CARB should focus its regulatory efforts on policies that will more effectively promote its goal of reducing emissions—specifically, a phase-out in sales of high-GWP HFCs with a clear exemption for reclaimed refrigerants and a robust suite of additional policies to encourage use of reclaimed refrigerants. Such policies, discussed further below, would incentivize better refrigerant management, reduce emissions and venting, and help to support the transition to new, lower-GWP equipment by giving economic value to legacy refrigerant.

#### **1. CARB Should Prohibit Previously SNAP-Approved HFC Alternatives in Existing Systems**

In the proposed SNAP Replacement Rule, and in any subsequent HFC-related rulemakings, CARB's goal should be to minimize the need for production of additional virgin gas and to ensure the gas in the installed base is properly managed, reclaimed and reused. To this end, in these rules CARB should prohibit the use of all previously SNAP-approved HFC substitutes in the aftermarket for service of legacy systems that use ozone depleting substance (ODS), particularly HCFC 22. Continued use of HFC refrigerants, the primary substitutes for ODS, in new equipment for new installations allows for an orderly transition to lower GWP refrigerants over time. In contrast, however, the aftermarket should be served primarily through the use of recovery and reclamation. We specifically encourage CARB to prohibit HFCs for use as substitutes in less efficient "vintage" equipment, which is primarily HCFC-22 equipment. Many of EPA's SNAP-approved substitutes, including those marketed as "drop-in" replacements, have a higher GWP than the refrigerant they have been approved to replace. In addition, using an HFC alternative in older equipment is less efficient and often requires even greater energy to achieve the same level of performance compared to the refrigerant designed for the system and may compromise the integrity of the system. Moreover, the combination of existing stockpiles, two more years of HCFC-22 production before the 2020 phase-out, and contributions from an active reclamation industry will ensure that there is

an ample supply of HCFC-22 to fully support the current and future aftermarket demand for HCFC-22 systems, without any need for production of HFC substitutes.

In addition to being unnecessary, production of HFC-based substitutes for use in these older systems also compounds the adverse environmental impact from the venting of refrigerants. Permitting unlimited supply of these HFC alternatives to support the aftermarket reduces the need to recover and reclaim the refrigerant in these systems and leads to poor refrigerant management practices and unnecessary venting of both the HFC alternative and the refrigerant it replaces. Moreover, poor service practices in the retrofit process can result in cross-contamination of the refrigerant, making it less likely the refrigerant in the system can or will be properly reclaimed, and therefore more likely the refrigerant will be vented. Prohibiting the use of HFC substitutes in the aftermarket will promote the use of reclaimed refrigerants, thus reducing venting and emissions, creating value for the legacy refrigerant in the market, and providing financial support for the ultimate transition to next generation of low-GWP equipment.

Notably, CARB's proposed SNAP Replacement Rule does not address the commercial and residential AC sectors, which are the largest and perhaps most emissive use sectors. These sectors continue to be served largely by HCFC-22, which has a lower GWP than most of the approved substitutes for HCFC-22.<sup>1</sup> More importantly, HCFC-22 production will be phased out entirely by 2020, at which point reclamation will become the primary source of HCFC-22 in all sectors. As a result, there is a finite supply of virgin HCFC-22 and, after January 1, 2020, there will be no additional HCFC-22 produced to service existing equipment. Conversely, there is currently an unrestricted supply of higher GWP HFC substitutes for HCFC-22. Allowing continued use of HFC substitutes in HCFC-22 systems makes it highly likely that ultimately, not only will the HCFC-22 in those systems be released, but that the additional HFC substitutes that will be produced to replace the HCFC-22 will be repeatedly vented and replaced. Prohibiting the use of HFC substitutes in all existing systems would help ensure that the legacy refrigerant, HCFC-22, is properly managed, preserved and re-used, promoting reclamation and reducing emissions.

The emission reductions, both direct and indirect emissions, that can be achieved through reclamation are significant. This was recognized by the American Carbon Registry ("ACR") through the adoption, in October 2015, of its protocol entitled "Methodology For The Quantification, Monitoring, Reporting And Verification Of Greenhouse Gas Emissions Reductions And Removals From Certified Reclaimed HFC Refrigerants And Advanced Refrigeration Systems" ("HFC Protocol"). For example, the HFC Protocol calculates that the lifecycle climate benefit of using reclaimed HCFC-22, as opposed to using virgin HCFC-22, is 1.65 metric tons of CO<sub>2</sub> Equivalent ("CO<sub>2</sub>eq") for every pound of reclaimed HCFC-22 used. Using reclaimed HCFC-22 instead of switching to a higher GWP HFC substitute, such as HFC-407A, increases the benefit to 1.92 metric tons of CO<sub>2</sub>eq per pound. To put this into perspective, the emissions avoided by every 10,000 pounds of reclaimed HFCs is the equivalent to taking nearly 1,000 cars off the road.

Equally important, the energy used to reclaim refrigerant is significantly less than the energy needed to manufacture a new HFC. Thus, increasing the quantity of refrigerant that is recovered and reclaimed will provide a considerable and corresponding reduction in indirect emissions

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<sup>1</sup> The GWP of HCFC-22 is 1,810, whereas the GWP of HFC substitutes (407A, 407C, 410A, 422B, 422C, 422D, 404A & 507A) ranges from 2,088 to 3,985

resulting from the production process. Simply stated, implementing policies that promote the recovery, reclamation and re-use of refrigerant is the “low hanging fruit” of greenhouse gas reduction and will immediately benefit the environment and accelerate CARB’s progress towards its 2030 reduction goals.

## **2. SNAP Rule Coverage Should Be Comprehensive and Consistent**

In addition, the proposed SNAP Replacement Rule could be substantially improved by making it more comprehensive and internally consistent. For example, the proposed rule bans a number of substitutes in new equipment in the retail food, and refrigeration sector but does not address any AC sector, whether industrial, commercial or residential, and which together represent approximately 60% of the market. In this regard, we acknowledge that CARB indicated at the October 2017 stakeholder meeting, its intention to proceed with a follow-up SNAP rule that will address chiller AC systems, but which would not include other AC sectors. Any rule that does not include residential and commercial AC dramatically limits the benefits that can be achieved. Accordingly, we urge CARB to address all sectors, particularly all AC sectors, preferably through expansion of this rule, or otherwise through a subsequent rulemaking to be presented as soon as possible.

Moreover, while it appears that the proposed rule generally targets substitutes with a GWP of greater than 2500, there are substitutes with a GWP of greater than 2500 that are not being prohibited, while other substitutes with a GWP of less than 2500 are prohibited, as follows:

- Not included in Supermarket Systems: R-421A, with a GWP of 2,630; R422B (ICOR XAC1 and NU-22B), with a GWP of 2,530;
- Not included in Remote Condensing Units: ICOR AT-22, with a GWP of 2,530; R-402A (HP-80), with a GWP of 2,746; R-421A, with a GWP of 2,630; R-422B (ICOR XAC1 and NU-22B), with a GWP of 2,530;
- Not included in Stand Alone Systems: Hot Shot (Hot Shot and Kar Kool, with a GWP of 3,337; R-402A (HP80). In addition, while these high GWP products would remain acceptable under the proposed rule, the rule would prohibit a number of refrigerants that have GWP of less than 2500 with some less than 2000 GWP, including: R-134a (1,430), R-407A (2,110), R-407C (1,770), R-407F (1,820), R-410A (2,090), R-410B (2,230), R-417A (2,350), R-424A (2,440), R-427A (2,140), R-437A (1,810), R-438A (2,270).

The proposed rule and any subsequent SNAP-type rules should be consistent in all sectors in terms of the substitutes that are prohibited and in terms of the maximum GWP level permitted, such that the expanded list of substitutes in new stand-alone systems, for example, is carried forward in the supermarket and remote condensing unit sectors as well.

## **3. CARB Should Adopt a More Comprehensive Strategy to Reduce HFC Emissions, Including a Phase-Out of Virgin Production and Sales of HFCs and Robust Policies to Promote Reclamation**

CARB’s number one goal should be to reduce the amount of refrigerant that is vented to the atmosphere, and we urge CARB to adopt a more comprehensive approach to reducing emissions

from HFCs. Towards, that end, we support CARB's proposal to prohibit the sale or distribution of refrigerants with a GWP of 2500 or greater by 2020 and with a GWP of 1500 or greater by 2024, and prohibitions on the use of high-GWP equipment in new commercial, industrial and residential equipment. We cannot emphasize enough, however, the importance of exempting reclaimed refrigerant as an essential part of a comprehensive strategy to reduce HFC emissions. Such an exemption will play a critical role in ensuring a smooth transition to new equipment and lower-GWP refrigerants, by providing owners of equipment that has remaining useful life flexibility in transitioning to newer equipment and avoiding stranded investments and substantially reducing costs to businesses and consumers. Further, allowing use of reclaimed refrigerant will reduce net emissions, by giving value to refrigerant in existing systems a strong economic incentive to properly manage such refrigerant rather than venting it. Further, by giving economic value to refrigerant in existing systems, an exemption for reclaimed will help to provide financial support for the transition to new equipment.

In addition to exempting reclaimed refrigerants from future sales bans, we strongly recommend that CARB make reclamation a key element of its strategy to reduce emissions and to take additional affirmative steps to promote reclamation. Every pound of virgin refrigerant that is added to an existing system is replacing a pound that was lost to the atmosphere. A strategy that promotes the recovery, reclamation and re-use of refrigerants, both HCFCs and HFCs, directly achieves CARB's goal of reducing HFC emissions by eliminating, or at least reducing, the need to service existing systems with newly manufactured product. By promoting reclamation, we can break the cycle of production for emission, and service the aftermarket without producing additional virgin refrigerant.

In addition to the forthcoming ban on production and sales of virgin high-GWP refrigerants, we specifically recommend the CARB consider:

- (1) Adopting a recycled-content requirement for bulk refrigerant sold in California.** We encourage CARB to consider requiring a certain percentage (10-20 percent) of all bulk refrigerant sold in California to be reclaimed gas. The threshold could also be increased over time as system owners transition to more environmentally friendly refrigerants. Adopting this requirement would help expedite the eventual phase-out any HFCs that are not otherwise banned by CARB. In addition, creating a greater economic value for used HFCs will stimulate better refrigerant management practices. System owners will also be able to leverage their existing refrigerant asset to reduce the cost of transitioning to a more environmentally friendly system.
- (2) Leveraging California's procurement policy to incentivize the use of reclaimed refrigerants to services existing state-owned or managed systems.** The environmental benefits of using reclaimed refrigerant to service state-owned or managed systems would be significant. The emissions avoided by every 10,000 pounds of reclaimed HFCs purchased by the State of California would be equivalent to taking nearly 1,000 cars off the road. EPA already maintains a list of certified refrigerant reclamation companies, reclaimed refrigerant is certified to meet the same purity specifications as virgin gas, and reclaimed refrigerant is identically priced as virgin gas. Consequently, there would be no additional cost associated with adopting such policy. In addition to the direct benefits, a state procurement requirement would give the private sector a greater incentive to

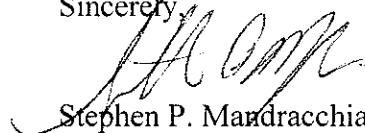
responsibly manage refrigerants. As companies recognize that their used refrigerant has an economic value, they will be more likely to minimize leaks and treat the refrigerant as an asset instead of a liability.

- (3) Adopt ACR's HFC Protocol for reclaimed HFC refrigerants.** California previously adopted the Climate Action Reserve protocol for destruction of ODS refrigerants, for the generation of compliance offset credits under California's GHG cap-and-trade system. Likewise, CARB should adopt a protocol for the generation of GHG compliance offset credits based on ACR's HFC Protocol for the use of reclaimed refrigerants. We recommend CARB formally adopt the protocol and promote its use to help incentivize the reuse and reclamation of the refrigerants already in the installed base.
- (4) Recognize reclaimed refrigerants as low or zero GWP alternatives.** More generally, we encourage CARB to explicitly recognize reclaimed refrigerants as low or zero GWP alternatives for purposes of regulatory policy and analysis. Reuse of refrigerant already in the installed base reduces the need for additional virgin refrigerant to service the aftermarket, resulting in an equivalent reduction in the quantity of new or additional refrigerant that is produced and ultimately released to the atmosphere. In addition, as stated promoting reclamation achieves further reductions by incentivizing better refrigerant management practices (*e.g.*, reducing leak rates) as end users see the refrigerant as an asset instead of a liability. Indirect emissions associated with the reclamation process itself are minimal by comparison to virgin production.

The reclamation industry should be viewed as a significant resource to CARB as it strives to achieve its greenhouse gas reduction goals. There are currently more than 60 EPA certified reclamation companies throughout the country, most of which are small businesses, that are providing vital services that reduce the need to produce refrigerant and reduce the total emissions of refrigerant gases on essentially a pound for pound basis. With proper support from progressive policies such as those set forth above, these businesses can play a critical role in supporting California's climate and economic goals.

We are grateful for the opportunity to provide our input to these matters. We would welcome the opportunity to discuss these ideas in greater detail with you or the appropriate staff on your team.

Sincerely,



Stephen P. Mandracchia  
Vice President Legal & Regulatory

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