- Assistant Secretary for Energy Efficiency, and Renewable Energy, U.S. Department of Energy, Mail Station EE–1, Forrestal Building, 1000 Independence Avenue., S.W., Washington, D.C. 20585.
- RE: Petition for waiver and application for interim waiver for Kool-Fire products.

Dear Ms. Ervin: For the past few months I have been working through Mr. Ed Pollock from the DOE and with Mr. Brian Dougherty with NIST to reestablish communications to resolve a "certification procedure" and/or "request for waiver" which we began in 1990. As of this date, Mr. Ed Pollock and I have agreed upon a course of action. The agreed upon approach consists of and includes the following four points:

1. The "cooling mode" performance of the Kool-Fire burner-assisted heat pumps will be evaluated as per the DOE heat pump and air conditioning test procedure. Kool-Fire systems will be tested at 82 degree F and 95 degree F and have an SEER rating.

2. Kool-Fire requests a waiver from having to use the DOE test procedure to evaluate the "heating" mode performance of Kool-Fire burner-assisted heat pumps. This waiver is requested because the existing test procedure does not state how to test burner-assisted heat pumps. An HSPF rating only reflects the seasonal space heating efficiency of allelectric heat pumps, not dual fuel heat pumps like the Kool-Fire HC and LTH models.

3. While Kool-Fire's request for a waiver from the "heating" mode portion of the DOE test procedure is being pursued through the public review process, Kool-Fire requests that an "interim waiver" be IMMEDIATELY granted.

4. Kool-Fire will continue to work on the development of a NEW test procedure for testing and rating the "heating" mode performance of dual-fuel, burner assisted heat pumps. In developing this new approach, Kool-Fire expects to use portions of the existing DOE test procedures for heat pumps.

Mr. Brian Dougherty and I have exchanged a great deal of information regarding the Kool-Fire product which we manufacture and distribute throughout the United States. I would request that Mr. Dougherty, due to his extensive involvement to date, continue to be assigned to this project.

As a result of the efforts of Mr. Pollock and Mr. Dougherty, we have reached the point where there is an understanding, as stated above, on the procedure to follow to resolve the "certification" requirement. *CRITICAL mid-term and short-term components to this process are the granting of a "waiver" and "interim waiver", respectively.* Therefore, this letter will serve to initiate our formal request for a "waiver" and "interim waiver" of the HEATING operation mode of the Kool-Fire two thru four ton "split system" *products for the reasons enumerated herein.* 

Following are excerpts of my most recent reply to Mr. Dougherty of June 28, 1994 in response to his letter of June 10, 1994 wherein I explain situations which exist that would justify your granting Kool-Fire this "interim waiver":

"A situation exists relating to our receipt of an "interim waiver". Lacking this "interim waiver", Kool-Fire's acceptance by certain State Energy Commissions has brought the distribution of our products to a virtual stand-still in those areas. This situation can and will cause both our manufacturing operation and distribution network to experience severe "economic hardship". We have been informed that with this "interim waiver", Kool-Fire distribution would be approved and we could actively compete in the market place with other heating/cooling manufactures. The sooner we have this "interim waiver" in hand, the faster we can work to develop a proper "heating" mode test procedure."

I have sent Mr. Dougherty all the information I could find related to laboratory testing, various certifications received, and numerous data compiled from field tests and subsequent reports presented since Kool-Fire's inception in 1979. Most of this testing was done in Canada by Ontario Hydro and the Canadian Gas Association (CGA), except for the AGA testing information from the early 80's on earlier versions of Kool-Fire models and current ETL certification procedures. I indexed this material to facilitate Mr. Dougherty's use and perusal. Unlike other "unique/dual-fuel" systems, Kool-Fire has been tested, perfected, and proven over the past 15 years, primarily in the Canadian marketplace. I believe this, in itself, lends creditability to it's concept and our requests for BOTH the "waiver" and the IMMEDIATELY NEEDED "interim waiver".

In this same letter to Mr. Dougherty, I commented on his suggestions regarding "possible testing methods" as follows: I. Regarding an SEER test for Kool-Fire:

a. I see no problem conducting this test, in the COOLING mode, like a single speed heat pump or air conditioner. My only thoughts as related to the SEER test is that. \* \* \* IN REALITY,

Kool-Fire is a COMBINATION air conditioner, reverse cycle "heat pump" TYPE unit which utilizes an auxiliary heat absorption system that is used in conjunction with a "matched" indoor forced air heat exchanger.

Any SEER test for "cooling" must be augmented with an appropriate test for the "heating" mode, else Kool-Fire could be misconstrued to be a "cooling" only type system. This would cast untrue representation of the product and put us at a competitive disadvantage.

IN REALITY,

"COOLING" IS SECONDARY to Kool-Fire's primary design intent of "most efficient"" utilization of BOTH energy sources used in the "HEATING" mode.

II. Regarding heating mode tests as Mr. Dougherty suggested:

a. There appears to be a problem differentiating a test procedure between the HC and the LTH model systems. To conduct a test at 17 Degrees F. in the "air to air" reverse cycle mode would not be indicative of a "true" indication of how any Kool-Fire system operates and would tend to misrepresent it's design purpose and intent. This also would cast an untrue representation of the product and put us at a competitive disadvantage. In fact, current electrical rates have increased to a point that now over 99% of the systems installed are the HC models. This is due to the fact that the "economic" balance point of natural gas and propane compared to electrical energy costs dictates changing to the "flame mode" at outdoor ambient temperatures of 42 degrees F. and higher.

Kool-Fire's true comparative annual "heating" test must consider the actual utilization of both energy sources used in the "heating" mode; based on the "economic" balance point of the fuels used, compared to the "thermal" balance point of a structure. These facts then could be factored with the "bin" temperature profiles similar to other DOE tests applied for competitive "year round" system. If these type facts are determined, and if this information were published in conjuction with the results of DOE tests performed at the higher temperatures of 47 Degree dry bulb and 43 Degree wet bulb, both steady state and cyclic; this information would be an accurate representation of Kool-Fire's efficiency.

b. Due to circumstances outlined above, I question whether a need exists to be concerned with developing a procedure to perform a DOE Frost accumulation test. As I understand this test, part of the equation considers the "negative" COP during the defrost cycle when the reversing valve causes an ordinary heat pump system to switch to the "cooling" mode.

Kool-Fire LTH model has NO "negative" COP. During defrost of the Kool-Fire outdoor coil the outdoor blower turns OFF and the fossil fuel burner turns ON to defrost the coil; Kool-Fire's compressor NEVER turns "off" Kool-Fire's reversing valve DOES NOT shift and cause the inside of the structure to be cooled. Unlike "ordinary" heat pumps, the "outdoor coil" of Kool-Fire is ENCLOSED and not subject to "wind effect". 100% of the energy used for defrost is used to heat the structure. While the ice is changing to water it transfers the "latent" heat to the circulating refrigerant that is heating the structure. This situation that occurs during the defrost cycle of a Kool-Fire should be included in the annual efficiency calculations for Kool-Fire and should be reflected as a CREDIT for Kool-Fire systems.

c. Since Mr. Dougherty had talked to Mr. Dave Young, from Ontario Hydro's Research and Development Department, and Mr. Dougherty referred to the Cd (Coefficient of degradation) factor, Dave probably has made him aware how the actual field tested cyclic performance profile of Kool-Fire differs from ordinary heating systems. The difference of Kool-Fire's actual operating profile should be reflected in the Cd factor applied in any evaluation equation. Then Kool-Fire can be accurately compared to others.

III. Could Kool-Fire be tested as a "Hybrid" heat pump?

After presenting Mr. Dougherty an explanation of Kool-Fire and the differences between Kool-Fire and heating systems evaluated in the "hybrid" heating system test procedures, Mr. Dougherty and I mutually agree that:

THIS HYBRID TEST IS IN NO WAY INDICATIVE OF A "true" indication of how any Kool-Fire system functions and could