MEETING LOG
DIRECTORATE FOR ENGINEERING SCIENCES

SUBJECT: National Propane Gas Association Appeal of the Adoption of the Flammable Vapor Ignition Resistance Test Methodology into the ANSI Z21.10 Domestic Water Heater Standard.

PLACE: Sheraton Airport Hotel, Cleveland, Ohio

MEETING DATE: December 13, 1999

LOG ENTRY SOURCE: Donald W. Switzer

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COMMISSION ATTENDEES:
Donald W. Switzer ES

NON-COMMISSION ATTENDEES:

Clem Erhardt,	Counsel for the Water Heater Industry Joint Product Development Consortium
Daryl Hosler,	Z21 Committee Chairman
Frank Stanonick	Gas Appliance Manufacturers Association
Bruce Sweicicki	National Propane Gas Association
Bill Harrigill	Rheem Manufacturing Company
Jack Langmead	Water Heater Industry Joint Product Development Consortium
Spence Greico	CSA International
George Gruss	CSA International
Julie Cairnes	CSA International

MEETING SUMMARY

The National Propane Gas Association (NPGA) appealed the decision of the ANSI Z21 Committee to adopt the Flammable Vapor Ignition Resistance (FVIR) Test Methodology. CPSC staff presented the attached testimony in support of adopting the test method.

Attachment

U.S. Consumer Product Safety Commission Staff Testimony
At the ANSI Accredited Z21/83 Committee Appeal Hearing
Of the National Propane Gas Association 's Appeal of the Adoption of
Section 2.38 "Flammable Vapor Ignition Resistance"
December 13, 1999

Background

Each year there are an estimated 2,000 fires caused by gas-fired water heaters igniting flammable vapors in the home. These incidents result in about 320 injuries and 20 deaths annually. These incidents are preventable.

Until now, the hazard of vapor ignition by water heaters has been addressed through warning labels and installation requirements in the model building codes. These codes require that water heaters installed in garages be elevated 18 inches to address the vapor ignition problem. As evidenced by the continuing incidents, this approach has not been successful. Furthermore, elevating the appliance does not eliminate the hazard, it only delays ignition. The only effective way to address the hazard is to design it out of the product.

To facilitate product development, a number of manufacturers formed the Water Heater Industry Joint Product Development Consortium. While all manufacturers had the opportunity to join, not all manufacturers joined the Consortium. In 1995, prototype testing began. As in all such research, in the beginning there were more failures than successes. However, with each failure, the manufacturers gained knowledge and improved the next prototype tested. By 1998, manufacturers had designs that consistently did not ignite vapors when exposed to the spill scenarios that were ultimately to be adopted by Z21/83 as the standard test conditions. Since then, manufacturers have been working to refine the technologies.

The water heater manufacturers, at the urging of the U.S. Consumer Product Safety Commission (CPSC) staff, have spent considerable resources developing new technologies to address this "hidden" hazard. CPSC staff has worked closely with the manufacturers in developing the technologies and is confident the new Flammable Vapor Ignition Resistant (FVIR) water heaters being developed will perform satisfactorily in the field. In fact, one manufacturer currently is selling flammable vapor ignition resistant water heaters. However, in order to certify the flammable vapor ignition resistance features of these new appliances, a test method is needed.

In 1992 the CPSC staff asked the ANSI Z21/83 water heater subcommittee to amend the Volume I Water Heater Standard, ANSI Z21.10.1, to address this hazard. The subcommittee at that time formed the flammable vapor working group, beginning the process to amend the standard. Progress was not satisfactory, and in June 1994, CPSC staff went to the Commission with a recommendation to begin federal rulemaking to develop a mandatory federal standard. As a result of the staff's recommendation to the Commission, the gas water heater manufacturers agreed to work closely with CPSC staff to develop flammable vapor ignition-resistant (FVIR) water heaters and the performance requirements necessary to certify their performance. As a result, the Commission did not initiate rulemaking. To date, the staff believes the progress in developing the standard has been satisfactory.

In 1994, the Gas Research Institute (GRI) formed the Flammable Vapor Technical Advisory Group (TAG) to develop a test methodology. The Gas Appliance Manufacturers Association contracted with Arthur D. Little, Inc. (ADL) to examine the incident data and to determine what gasoline spill

scenarios would need to be covered by the test method to adequately test emerging technologies. One of the conclusions from this study was that the bulk of incidents do not occur in garages. Garages account for only about a third of the incidents. The remaining incidents happen in other parts of the house, such as the basement, which may not have adequate overhead clearance to allow elevating the water heater as required in the current codes. Furthermore, the model building codes do not require elevating water heaters in locations other than garages. This is why depending on the local codes has not effectively addressed this problem.

In 1999, the Z21/83 Committee adopted a test methodology based on the ADL evaluation of the incident data. Two spill scenarios are included in the standard. In the first, summer blend (low volatility) gasoline is spilled away from the water heater. The vapor cloud above the spill is not agitated in any way, resulting in conditions that test a water heater's ability to withstand a slow buildup of vapor concentration. The second scenario involves spilling winter blend (high volatility) gasoline toward the water heater and agitating the vapor cloud to encourage a rapid rise in concentration. While these two conditions do not represent all the conditions possible in the field, they do define the "envelope." That is, any condition a water heater may encounter in the field would most certainly fall between these two extremes. CPSC staff has carefully examined the test requirements adopted by Z21/83, finds them to be adequate, and has supported their adoption.

Since 1992, the need for the proposed test method has been discussed publicly at Flammable Vapor Working Group meetings, TAG meetings, and water heater subcommittee meetings. In addition, several special meetings have been held to demonstrate the technologies being developed and the new performance requirements. Representatives from the NPGA attended or had the opportunity to attend all of these meetings.

All water heater manufacturers currently have designs that will pass the test method adopted by the Z21/83 Committee at its April 1999 meeting. One manufacturer, in fact, is currently offering FVIR technology on some of its product line. CSA International has built a new state-of-the-art test facility to certify new FVIR products. It is crucial that the Z21/83 Committee's decision to adopt Section 2.38 Flammable Vapor Ignition Resistance proceed. Without requirements to certify the performance of the new technologies, some manufacturers may not introduce new technology. Failure to adopt this standard at this time would, in my mind, demonstrate a failure of the voluntary consensus process to solve this problem.

NPGA's Objections

1. <u>The Ruling to Disallow Discussion on Cost versus Benefit</u>

The argument presented in the NPGA's appeal "that the committee should not have decided such an important issue without having the benefit of a cost/benefit analysis to assist in that decision" seems odd to me. The Committee decides on important safety provisions for water heaters and other gas appliances every year without a discussion of cost/benefit. Never in my years of participating in Z21 standards has this been an item of discussion at standards meetings. However, as we all understand, manufacturers participating in this process consider the cost implication of all new provisions to the standard in deciding to support them. If NPGA wanted to discuss the cost/benefit implication of this standard it has had ample opportunity through its representation on the subcommittee to do so.

The U.S. Consumer Product Safety Commission, a federal regulatory agency, must determine that the societal costs and benefits bear a reasonable relationship before issuing a federal rule for products like water heaters. CPSC's cost/benefit analysis involves a sophisticated set of evaluations that

include estimating the value of a life, the direct and indirect cost of injuries, and the property damage cost from flammable vapor incidents involving water heaters.
The Commission staff published in 1994 an estimate that water heater costs could increase by as much as $85.00 per unit to eliminate the hazard. This information has been public for over five years.

2. Premature Standardization of a New Technology

I must say that I am puzzled by NPGA's concern that a standard would be adopted by Z21 before there was adequate data showing that the new technologies "...will operate safely and efficiently in the field under even the most controlled conditions." The appellant takes this position in spite of the fact that it's own Technology and Standards (T&S) Committee recommended that NPGA support the standard. Reliable technology is available. In fact, one major water heater manufacturer began producing these heaters in October of this year and has offered publicly to license its technology to any company that needs or wants it.

The purpose of the field tests is not to test the FVIR technology, but to verify that the technology does not introduce a new hazard in the field, to verify its durability, and to estimate what effect, if any, long term operation with the FVIR technology will have on the performance of the water heater. Field tests are underway in all parts of the country, at multiple altitudes, various tap water conditions, and various climates. These tests are very comprehensive. These tests to date show that there is no impact on the safe operation of FVIR-equipped water heaters.

The standard will, at the earliest, become effective in April of 2001. All field tests will be completed prior to that date. If during field tests a problem is uncovered, the mechanism is in place to delay the effective date of the standard to resolve the problem with the product, or amend the standard. There are numerous instances where this has happened with other changes.

The appellant asserts that the FVIR technology has not been tested at different altitudes. That is correct. However, manufacturers have assured CPSC staff, in writing, that high and low altitude testing will be completed before the effective date of the standard. CPSC staff believes that, considering the technologies being used, the FVIR technologies will not be affected by changes in altitude.

NPGA raises the question of serviceability of the FVIR technology. FVIR technology-equipped water heaters must pass the serviceability requirements currently in the standard. Typically, service to a water heater consists of changing the thermocouple if it fails. Since the combustion chamber on an FVIR water heater must be leak-tight, there must be a seal where the thermocouple penetrates the combustion chamber and a seal around the service access door. The manufacturers have decided to design the new products to preclude consumer servicing, thereby necessitating professional servicing. CPSC staff believes that servicing can be easily accomplished by service technicians without special training. In the event that the servicer does not achieve a leak-tight seal, the FVIR feature may be defeated. However, this will not interfere with the safe operation of the appliance under non-spill conditions. The likelihood that an FVIR-equipped water heater will be both mis-serviced and then exposed to a gasoline leak is remote. With regard to testing FVIR technology after it has been installed in the field, that is not possible. The only way to attest to the performance of the FVIR feature is to expose it to gasoline vapors. Obviously, that cannot be done in the home.

If a water heater with FVIR technology is exposed to flammable vapors, it is designed to stop operating. Manufacturers have designed the units so that they must be replaced after a flammable vapor incident. The CPSC staff concurs with this decision. A spill incident places such stress on the

appliance that it is prudent to replace it. If the FVIR feature on a water heater is called on to operate, it will be immediately apparent to the service technician that there has been a flammable vapor incident and the product should be replaced.

NPGA's Proposed Solution

ANSI Z21 standards set the **minimum** level of performance acceptable to the manufacturing community and the certifying agency. To make a safety feature "optional" is not acceptable to the CPSC staff.

Relying on local building codes to "determine where such water heaters must be installed" is not an acceptable strategy to address the hazard of flammable vapor ignition. At present, the model building codes require only those water heaters located in garages to be elevated. However, about two-thirds of the flammable vapor incidents happen in other parts of the home. In those locations where there are local building codes, those codes are for new construction or locations where a building permit has been obtained for the water heater installation. Since about two thirds of the water heaters sold each year are replacement water heaters, it is very likely that no building permit would be obtained, defeating the strategy of relying on the local codes.

If Section 2.38 is not approved at this time or is made optional, the voluntary standard process will, in my view, have failed. In either case, CPSC staff will immediately bring this to the attention of the Commission and will examine the need for a mandatory rule to make all water heaters sold in the U.S. meet the requirements of Section 2.38.

Thank you for allowing the CPSC staff to testify at this hearing. Voluntary standards activities are normally delegated to the Commission staff. Therefore the positions stated in this testimony are those of the Commission staff. They have not been reviewed or approved by the Commissioners.