UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF RHODE ISLAND

ALBERT L. GRAY et al. Plaintiffs vs. JEFFREY DERDERIAN et al Defendants	C. A. No. 04-312-L

AFFIDAVIT OF DAVID P. DEMERS, PE

1. I am a professional fire protection engineer, professional mechanical engineer and Certified Fire Investigator. I have a Bachelor of Science Degree in Mechanical Engineering received in 1974 and a Master of Science Degree in Fire Protection Engineering received in 1984 from Worcester Polytechnic Institute.

2. I am employed by Demers Associates, Inc., a fire protection consulting firm that I established in 1981. Prior to that time, I was a Fire Analysis Specialist and Manager of the Fire Investigations Department of the National Fire Protection Association. I am also the Deputy Fire Chief of the Lunenburg, MA Fire Department where I have been a member for 35 years. A copy of my curriculum vitae is attached to this affidavit.

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3. I have investigated and analyzed numerous multiple fatality fires including the Providence College Dormitory Fire (10 fatalities), the Beverly Hills Supper Club Fire (167 fatalities), the MGM Grand Hotel Fire (87 fatalities) and the San Juan Dupont Plaza Fire (97 fatalities). I have investigated or analyzed fatal fires for over 30 years with the total number of deaths exceeding 1,500 people. A high percentage of these fire fatalities have been the result of the rapid fire growth and development from burning foam plastic.

4. I have been retained by the Plaintiffs' Steering Committee with regard to the Station Night Club Fire. I spent approximately 3 weeks on the scene of the fire, after it was released by public officials, digging through and sifting the debris, collecting artifacts and reconstructing portions of the building. Included in the artifacts collected from the fire scene were small pieces of "egg crate foam" near the base of the stage that were shielded during the fire by falling debris. Further, I have examined the videotape taken of the interior of the Station Night Club by a local television crew.

5. Non-fire retardant treated foam plastic is defective and an unreasonably dangerous and unsafe product. The foam involved in the Station fire, appears to be non-fire retardant, lightweight polyurethane foam plastic. This sculptured foam had a characteristic "egg crate" form. Polyurethane foam plastic is made from petrochemicals and is frequently called "solid gasoline" by fire officials.

6. The foam involved in the Station Night Club fire was non-flame retardant, easily ignited, burned vigorously with an extremely high heat release rate, melted and dripped creating burning flammable liquid and produced copious amounts of heavy, thick, black smoke and toxic products of combustion, especially carbon monoxide. In addition to the production of carbon monoxide, oxygen was depleted, the concentration of carbon dioxide increased, and room temperatures rapidly escalated.

7. The high heat release rate of non-fire retardant flexible polyurethane foam can create "flashover" conditions in a fire in a very short period of time. "Flashover"

occurs during fire growth and development within an enclosure when thermal conditions expose all of the combustible materials and ignition occurs almost simultaneously.

8. Use of foam plastic as an interior finish on walls and ceilings, especially in a place of assembly, is extremely hazardous. Highly combustible interior finish in the form of "egg crate foam" was the primary factor in the initial rapid rate of fire growth and development in the Station Night Club fire. The extremely fast fire growth included flame and heat, visible smoke and toxic products of combustion. Foam plastic used as an interior finish has been the primary fuel load in several multiple fatality fires in assembly occupancies.

9. General Foam knew of the importance of the end use/application of their foam products and of the need to warn about the proper end use and application.

10. General Foam was well aware of the long history of fire deaths and injuries due to the rapid burning of foam plastic and knew or should have known of the hazards.

11. There have been thousands of fires, hundreds of casualties and millions of dollars of property lost in which untreated polyurethane foam has been the primary fuel involved. The hazards of rapid fire growth, high rates of heat release, heavy dense black smoke and toxic products of combustion have been known to the foam plastics industry since the 1960's. General Foam has been part of that industry for many years. The extreme hazards associated with foam plastic and its potential misuse was foreseeable and known or should have been known by the foam plastics industry.

12. The hazards of untreated polyurethane foam are generally not known by the general public based on my professional experience, hundreds of fire investigations involving foam plastic including interviewing victims and reviewing their testimony and literature related to the fire safety of the public.

13. During the 1960's and early 1970's major foam plastics corporations manufactured and marketed polyurethane foam by advertising it as "self-extinguishing" based on small scale fire tests that in no way represented the hazards during real fire conditions.

14. In 1974, a Consent Decree between the Society of the Plastics Industry, numerous foam plastic manufacturers and the Federal Trade Commission was ordered indicating the unique and dangerous fire hazards associated with foam plastics, the limitations of small scale testing to evaluate the fire performance under actual fire conditions and requirements for notice of the Consent Decree in many industry and trade journals. This FTC Decree is widely known in the foam plastics industry.

15. Cellular or foamed plastic materials have been regulated for use as an interior finish since 1976. The 1976 National Fire Protection Association's Life Safety Code was the first national consensus standard that included restrictions on the use of foam plastic. The Society of the Plastics Industry (SPI) was represented on the Sectional Committee on Interior Finish, Furnishings and Decorations by Mr. A. J. Bartosic. This sectional committee was responsible for promulgation of the requirements and limitations of the use of foam plastics for interior finish. General Foam had special knowledge of the hazards of foam plastic that the general public clearly did not have it.

16. The use and misuse of foam plastic as an interior finish is a foreseeable hazard that General Foam should have taken steps to prevent. There have been previous major fire incidents involving the misuse of foam plastics that have been documented as follows:

<u>10/31/1970 St. Laurent du Pont, France</u>: A fire in the Cinq-Sept Night Club resulted in the deaths of 144 people as a direct result of the rapid fire

development on polyurethane foam interior finish. According to a report published by the National Fire Protection:[1]

> The Cinq-Sept had been built by its three owners, with a minimum of professional aid, to resemble a white grotto. To that end the owners had personally sprayed on ceilings, walls, and loges a white foamed plastic material to represent the rough appearance inside a cave . . .
>
> The owners made their own plastic foam, using polyurethane pellets as the base material. The foaming agent is not known. The owners knew that the foam was cheap, and the patrons were later to discover it to be highly combustible . . .

5/6/1974 West Hollywood, CA: A fire that ignited a television studio set for the children's show, Sigmund and the Sea Monster, at the Samuel Goldwyn Studios resulted in injuries to three people and property loss of over $3 million. The fuel for the fire was non-fire retardant treated polyurethane foam. The flame front expanded with such speed that the pressure of the fire bases pushed out one of the exterior walls of the building. The foam plastic, which was intended to be used as roof and cold storage insulation in industrial buildings, was used by technicians to create the interior of the television set and was poured or sprayed on forms made in the studio.

12/31/1986 San Juan, Puerto Rico: A fire was intentionally set in a ballroom being used to store furniture in the Dupont Plaza Hotel. The fire spread to an "Air Wall", which was a portable partition used to sub-divide the ballroom. The partition was manufactured using polystyrene foam plastic which was a significant contributor to the fire growth and development and heavy black toxic smoke. The foam plastic was intended to be used as insulation on the exterior of buildings. There were 97 fatalities and nearly 150 injured, many seriously, as a result of this fire.

17. General Foam should have taken every possible step to insure that the inherently dangerous material produced by them was not misused . The hazards of foam plastic are not obvious to the general public and special notice must be given.

18. The physical form of the foam plastic used on the walls and ceiling of the Station nightclub has been referred to as an "egg crate." This egg crate form is one that

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[1] National Fire Protection Association. "White Grotto Becomes Black Tomb," *Fire Journal, May 1971.* This fire was also referenced in *American Burning, The Report of The National Commission on Fire Prevention and Control*, U.S. Govt. Printing Office, 1973, p. 61.

is familiar to the general public. "Egg crate" foam is used on the walls and ceilings of anechoic chambers and sound recording studios. However, the foam used in sound recording and measuring facilities and studios is of a different chemical composition (a thermoset material which chars in place rather than a thermoplastic, like polyurethane, which melts and drips) and built in fire protection, usually automatic sprinklers, is provided. The general public would not know the difference in the foam plastics due to the physical form only. There is no way to visibly identify the differences in the foams further requiring adequate warnings.

19. There was a need for the foam industry, and General Foam, to follow "product stewardship" practices in order to insure that hazardous products would not be used in an environment that would be a high risk to the public. Product stewardship is a widely used practice that follows the use of raw materials, intermediate products and final goods through the design, manufacture, marketing, distribution, use and disposal to insure proper application and use in order to protect the public. General Foam had to be satisfied that its foam plastic product was going to be used for safe use and application before it sold it.

20. Due to the fire characteristics of non-flame retardant flexible polyurethane foam, this product should not be used in any commercial application in which there is the slightest possibility of a fire caused by or resulting in an open flame. The manufacturer had a duty to provide this warning and to warn of the hazards and follow product stewardship practices.

21. It was foreseeable that the great majority of State and Town fire inspectors, including those in West Warwick, were not sufficiently trained, even to the point of not being certified in accordance with National Fire Protection Association Standards. Due to that inadequate training, and also due to budgetary limitations and other reasons, it was foreseeable by manufacturers such as General Foam, that such fire inspectors could be expected to inadequately inspect night-clubs such as the Station nightclub. I developed this above knowledge and awareness from my

experience listed above, and from my work as Vice-Chairman of the Massachusetts State Board of Fire Prevention Regulation, which promulgates the State Fire Code.

22. Ignition, either accidentally or intentionally, of a hazardous product in a nightclub environment is foreseeable. According to the Federal Emergency Management Administration, "the most common causes of fire at nightclubs are incendiary, electrical, cooking and smoking. Incendiary fires at nightclubs are nearly twice as frequent as those in all structures."

23. The polyurethane foam manufactured by General Foam or one of its predecessor or affiliated companies was sold in bun form to American Foam. American Foam then cut the foam, giving it its "egg crate" convolutions. The foam was not otherwise altered, modified or incorporated into any other product. American Foam sold to the owners of the nightclub the exact same product that it had received from Foamex or its predecessors, with the only change being the cutting of the bun. This cutting did not result in any relevant or material changes in the chemical composition of the product. The foam was not a component of anything; it was the product itself with the only difference being a different surface geometry. General Foam was the manufacturing expert.

David P. Demers

DAVID P. DEMERS, PE

State of Massachusetts
County of Worcester

5th SUBSCRIBED AND SWORN to before me by David P. Demers, PE, on this day of October, 2004.

Linda H. Douglas

Notary Public
Commonwealth of Massachusetts
My Commission Expires:

Linda H. Douglas
Notary Public
Commonwealth of Massachusetts
My Commission Expires
February 12, 2010

DEMERS ASSOCIATES FIRE PROTECTION CONSULTANTS

DAVID P. DEMERS, PE

Educational Background:

Worcester Polytechnic Institute - Worcester, MA
1974: Bachelor of Science in Mechanical Engineering. Tau Beta Pi (Engineering) and Pi Tau Sigma (Mechanical Engineering) Honor Societies.
1984: Master of Science in Fire Protection Engineering. Salamander (Fire Protection Engineering) Honor Society.

Quinsigamond Community College - Worcester, MA
1973: Fundamentals of Fire Prevention (one semester course).

Mount Wachusett Community College - Gardner, MA
1975: Fire Cause and Origin (one semester course).

Professional Experience:

Demers Associates Inc. - Lunenburg, MA
1981-Present: President. Fire protection engineering and consulting. Services include building design, code and standard compliance, sprinkler system design, special hazard protection, process safety management, fire/explosion investigations and loss analysis, technical support for litigation, emergency planning and training, and fire service studies.

Lunenburg Fire Department - Lunenburg, MA
1969-Present: Deputy Chief. Duties include incident command for fire fighting and other emergency operations, code enforcement, technical support and fire investigations for this municipal call fire department. Certified Fire Fighter, Fire Investigator and Hazardous Materials Responder.

National Fire Protection Association - Boston, MA
1977-1981: Fire Analysis Specialist and Manager, Fire Investigations Department. Responsible for conducting in-depth investigations and engineering analysis of fires of technical significance.

FIREPRO Incorporated - Wellesley Hills, MA
1974-1977: Associate and Project Manager. Fire protection engineering and fire investigations.

U. S. Forest Service - Angeles National Forest; Pasadena, CA
1973: Forest fire fighter and aircraft support operations.

Baker Fire Equipment -Worcester, MA
1971-1973: Portable fire extinguisher and fixed suppression system installation, inspection, testing and maintenance.

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Professional Registration, Licenses and Certifications:

Massachusetts -	Registered Professional Engineer Mechanical Engineering, No. 29929 Fire Protection Engineering, No. 33270 Licensed Construction Supervisor, No. 020803 Licensed Sprinkler Journeyman, No. 002879
New Hampshire -	Registered Professional Engineer, No. 7172 Mechanical and Fire Protection Engineering Roster Listings
Maine -	Registered Professional Engineer, No. 6017
Illinois -	Licensed Professional Engineer, No. 062-056094

International Association of Arson Investigators, Certified Fire Investigator No. 22-099

National Board on Fire Service Professional Qualifications, Fire Investigator, NFPA 1033, No. 191539

Boards, Appointments and Awards:

Massachusetts Board of Fire Prevention Regulations - Mechanical Engineer Member, Gubernatorial Appointment, 1984 -Present; Clerk, 1997-Present; BFPR Representative to the Fire Prevention-Fire Protection Board for the *Massachusetts State Building Code,* 1997-Present; Governor's Task Force on Building and Fire Safety, 2003

Applewild School Board of Trustees; Fitchburg, MA 1992-2003

Nashua Valley Council, Boy Scouts of America: Council President 2002-2003; Vice President, 2000-2002; Executive Board, 1999-2003; Unit Leader, 1993-2002; National Eagle Scout Association, Life Member; Silver Beaver Award for Distinguished Service to Youth, 2001

Worcester Polytechnic Institute: Ichabod Washburn Young Alumni Award for Professional Achievement, 1989

National Fire Protection Association: The Special Achievement Award for Significant Contributions to the Development of NFPA Codes and Standards, 2004

Memberships:

Society of Fire Protection Engineers - Member
New England Chapter of SFPE - Member, Chapter President 1985-1986
National Fire Protection Association - Member
American Society of Mechanical Engineers - Member
American Society of Heating, Refrigeration and Air Conditioning Engineers - Member
Fire Prevention Association of Massachusetts – Active Member
International Code Council - Professional Member
National Fire Sprinkler Association
NFPA Technical Committees:
- Fire Protection for Commercial Cooking (NFPA 96), Chairman 1996-Present
- Portable Fire Extinguishers (NFPA 10), Chairman 1986-1996
- Protective Equipment for Fire Fighters 1982-1986
- *Life Safety Code* (NFPA 101) Sub-Committee for Detention and Correctional Occupancies 1981-1985

DAVID P. DEMERS, PE

PUBLICATIONS

BOOKS:

Best, Richard L. and Demers, David P. *Investigation Report on the MGM Grand Hotel Fire; Las Vegas, Nevada; November 21, 1980.* Boston: NFPA, 1982.

Colonna, Guy R., editor; Demers, David P., contributing author for Chapter 6, Emergency Evacuation Drills. *Introduction to Employee Fire & Life Safety.* Quincy, MA: NFPA, 2001.

Demers, David P. *Fire in Syracuse: Four Fire Fighters Die.* Boston: NFPA, 1978.

Demers, David P. and Willey, A. Elwood. "Fire Loss Investigation." *Fire Protection Handbook.* 15th ed. Boston: NFPA, 1981.

Demers, David P. "Selection, Operation, Distribution, Inspection and Maintenance of Fire Extinguishers." *Fire Protection Handbook.* 17th ed. Quincy, MA: NFPA, 1991.

Demers, David P. "Section 12, Chapter 9, Ventilation of Commercial Cooking Operations." *Fire Protection Handbook.* 19th ed. Quincy, MA: NFPA, 2003.

Demers, David P. "Section 13, Chapter 19, Industrial Occupancies." *Fire Protection Handbook.* 19th ed. Quincy, MA: NFPA, 2003.

Lathrop, James K., editor; Demers, David P., contributing author. *Life Safety Code Handbook.* 2nd ed. Boston: NFPA, 1981.

PERIODICALS:

"21 Die in Saint John, New Brunswick Jail Fire." *Fire Journal,* March, 1978.

"42 Die in Maury County, Tennessee Jail Fire." *Fire Journal,* March, 1978.

"Five Dead in Danbury, Connecticut Federal Correctional Institution Fire." *Fire Journal,* March, 1978.

"Seven Dead in Gasoline Tank Truck Fire in Beattyville, Kentucky." *Fire Command,* April, 1978.

"Improperly Placed Smoke Detectors Fail to Save Two Children." *Fire Journal,* May, 1978.

"Nine Die in Washington, DC Movie Theater Fire." *Fire Journal,* May, 1978.

"Successful Operations Hold Losses Down in Furniture Mart Fire." *Fire Command,* June, 1978.

"Ten Students Die In Providence College Dormitory Fire." *Fire Journal,* July, 1978.

PUBLICATIONS; DAVID P. DEMERS, PE

"Rapid Response Marks DC-10 Fire Fighting Operations at Los Angeles Airport." *Fire Command,* September, 1978.

"Four Fire Fighters Die in Syracuse Fire." *Fire Command,* October, 1978.

"Brooklyn Roof Collapse Claims Six Fire Fighters." *Fire Command,* December, 1978.

"Penal Institutions: Fire Safety vs. Security." *Fire Journal,* March, 1979.

"Fire in Quebec Hotel Kills Eleven." *Fire Journal,* May, 1979.

"Texas Pipeline Incident Tests Area Services." *Fire Command,* May, 1979.

"Hotel Fire Kills Ten." *Fire Command,* June, 1979.

"Ten Die in Greece, NY Hotel Fire." *Fire Journal,* July, 1979.

"Familiar Problems Cause Ten Deaths in Cambridge, OH Hotel Fire." *Fire Journal,* January, 1980.

"Pre-Plan for Telephone Communications Failure." *Fire Command,* March, 1980.

"Ten Killed in Holiday Inn Fire." *Journal of the Fire Protection Engineer,* UNISAF: Kent, England, Volume 73 (June 1980), 34-35.

"Forty Eight Die in Chapais, Quebec Social Club Fire." *Fire Journal,* September, 1980.

Bell, James R. and Demers, David P. "24 Residents Die in Hotel Fire, Life Safety Code Violations Contributed to Their Deaths." *Fire Command,* December, 1980.

"Twenty Five Die in Mississauga, Ontario Nursing Home." *Fire Journal,* January, 1981.

"Twenty Five Die in Nursing Home Fire." *Fire Command,* March, 1981.

"Fire at the MGM Grand." *Fire Journal,* January, 1982.

"Las Vegas Hilton Fire." *Fire Journal,* January, 1982.

"Two Fire Fighters Die in Boulder, Colorado Smoke Training Drill." *Fire Service Today,* August, 1982.

"Getting the Most From Large Diameter Hose." *Fire Engineering,* October, 1983.

"Nuts and Bolts of Drafting, Part 1." *Fire Command,* February, 1984.

"Nuts and Bolts of Drafting, Part 2." *Fire Command,* March, 1984.

"An S.O.P. for Chimney Fires." *Fire Command,* January, 1985.

"NFPA's Role in Fire Fighter Safety." *Fire Journal,* May, 1986.

"Fire at Walmart." *FPC/Fire Protection Contractor,* December, 1998.

SELECTED TECHNICAL REPORTS:

Fire Incident Analysis, 500 KV Spreading Yard Tunnel, Grand Coulee Dam; July 20, 1981. Report to the Bureau of Reclamation, U. S. Department of Interior; August, 1981.

Fire Incident Analysis, Training Exercise, Two Fire Fighter Fatalities; Boulder, CO; January 26, 1982. Report to the City of Boulder, CO; March, 1982.

Fire Incident Analysis, Bow Drill 3 Offshore Oil Drilling Rig, Off the Coast of Newfoundland Canada; April 21, 1987. Report to Bow Valley Offshore Ltd. Partnership; March, 1988.

Fire Incident Analysis, Fire Fighter Fatalities; Hackensack, NJ; July 1, 1988. Report to the International Association of Fire Fighters; September, 1988.

Investigation Report, Hydrogen Explosion, Low Pressure Chemical Vapor Deposition Apparatus. Report to the Norton Company; Northborough, MA; October, 1990.

Fire Protection and Prevention Needs Analysis, Devens Commerce Center. Report to the Massachusetts Government Land Bank; August 9, 1995.

Explosion Investigation Report, Weather Data Buoy 3D50, Station ID: 46014, Twenty Nautical Miles West of Point Arena, CA; Date of Loss 10/3/99, 1758 Hours PDT. Report to the National Data Buoy Center, National Oceanic and Atmospheric Administration, Stennis Space Center, MS; December 22, 1999

Explosion Investigation Report, Tsunami Warning Buoy 2.6D04, Station ID: 46404, On Board the Fishing Vessel Karin Lynn off the Coast of Seattle, WA: Date of Loss 4/1/04. Report to the National Data Buoy Center, National Oceanic and Atmospheric Administration and Science Applications International Corporation, Stennis Space Center, MS: May 21, 2004

MASTER OF SCIENCE DEGREE THESIS:

Smoke Control for Atria in Buildings. Worcester, MA: Worcester Polytechnic Institute, December, 1983.

AFFIDAVIT OF CARL L. DUNCAN
FIRE ANALYST

1. I am a fire analyst with over thirty-six (36) years experience in fire fighting, fire investigation, code enforcement and fire incident analysis.

2. I have over seventeen (17) years of municipal fire service with over ten (10) years in fire investigation and fire safety inspection. I have been certified by the California State Department of Education, fire service training program in fire investigation, fire inspection and fire command at their highest level.

3. I obtained a degree in fire science in 1969 from Santa Ana College. I obtained a vocational teaching credential from the California Department of Education and was assigned to that department for the purpose of developing an educational curriculum for Fire Investigation and Fire Code enforcement.

4. I have taught college level courses in fire cause and origin, fire investigation, fire and building codes and ordinances, fire protection systems and fire defense planning.

5. I am president of CLD Associates, LLC, a company I founded in 1980 for the purpose of providing consulting services in fires, explosions and related fire analysis issues.

6. I have coordinated the investigation and analysis of numerous large life and property loss incidents including:

    1. The Beverly Hills Supper Club fire – 167 fatalities
    2. The MGM Grand Hotel fire – 87 fatalities
    3. The Las Vegas Hilton Hotel fire
    4. The San Juan Dupont Plaza Hotel fire – 97 fatalities
    5. The Happyland Social Club fire in New York – 100 fatalities
    6. The Pepcon Rocket Fuel Oxidizer Plant fire and detonation
    7. The Imperial Foods Plant fire, Hamlet, NC – 25 fatalities

7. I have been retained by the plaintiffs steering committee in the matter of The Station Night Club fire. I spent over six (6) weeks coordinating the analysis of this fire incident including the removal and retention of artifacts in the form of "Egg Crate" form.

8. Flexible polyurethane foam as applied to the interior structural walls at The

Station Night Club in West Warwick, RI was unreasonably dangerous, defective and unfit for the purpose. The fire performance characteristics of flexible polyurethane foam render it extremely hazardous to be applied on any exposed surface in a structure. The polyurethane foam industry, including General Foam, had intimate knowledge of the extreme flammability hazards of polyurethane foam. The general public has not been provided the knowledge of the extreme flammability, ease of ignition and rapid flame spread characteristics of polyurethane foam.

9. Flexible polyurethane foam has been identified for decades as a readily ignitable, highly flammable and toxic material. The flexible foam industry for years applied inappropriate and misleading flammability ratings encouraging the misuse of this highly flammable and unreasonably dangerous product in many forms and applications, advertising it as non-flammable and self extinguishing.

10. In the fire prevention and product safety community, flexible polyurethane foam has often been referred to as "solid gasoline" because of its extremely hazardous fire performance characteristics. While flexible polyurethane foam can be manufactured with a wide variety of shapes, densities and characteristics, including flame retardancy, the flexible polyurethane foam of the type involved in The Station Night Club fire is readily ignited, burns violently, propagates flame spread rapidly, will quickly melt into a liquid that will drip or flow as it continues to burn, and produces copious amounts of thick smoke and toxic gases. The result is a product that can burn extremely rapidly. A fire that involves non-flame retardant flexible polyurethane foam can quickly progress to the point where it cannot be readily extinguished.

11. The failure of the foam industry to provide adequate product stewardship and specific use and application warnings and restrictions has resulted in hundreds of deaths and millions of dollars in fire loss in fire incidents I have personally investigated.

12. Application and use warnings are non-existent or deficient and I am unaware of any intelligible warnings as to use and application available to the end user. Without such warnings as to the true fire hazards of flexible polyurethane foam, it is not only foreseeable by General Foam but predictable that their product would find its way into a host of misapplications, including acoustical applications as found at The Station Night Club, creating extreme life and fire safety hazards.

Carl L. Duncan

State of Kentucky
County of Boone

6th SUBSCRIBED AND SWORN to before me by Carl L. Duncan, on this
6th day of October, 2004.

Carol Baker
Notary Public
Commonwealth of Kentucky

My Commission Expires: 9-15-2005

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF RHODE ISLAND

ALBERT L. GRAY, ADMINISTRATOR et al	:	
Plaintiffs	:	
Vs.	:	**C.A. No. 04-312-L**
JEFFREY DERDERIAN et al	:	
Defendants	:	

AFFIDAVIT OF GORDON DAMANT

Gordon Damant, being first duly sworn, states as follows:

1. I am currently West Coast Director, Inter-City Testing and Consulting Corporation (ITC) of California, Sacramento, CA. ITC is a national company with offices in Mineola NY, Boca Raton FL., and Sacramento CA. ITC provides consultants, expert and forensic engineering services to clients throughout the United States.

2. Prior to accepting my present position, for 30 years I was employed by the State of California, Department of Consumer Affairs, Bureau of Home Furnishings and Thermal Insulation. While with the State of California I worked as a textile chemist from 1963 - 1968, with responsibility for instrumental methods of analysis, including infrared spectrophotometry, visible and ultraviolet spectroscopy, atomic adsorption spectroscopy, gas chromatography, differential scanning calorimetry and differential thermal analysis.

3. I was Head of Flammability Research from 1968 - 1978, with responsibility for developing all of California's flammability standards for a variety of consumer products, including mattresses and upholstered furniture. While Head of the Flammability Research Laboratory I wrote all of California's flammability standards for consumer products, including Technical Bulletins 116, 117 and 133 for upholstered furniture and Technical Bulletins 26, 105, 121 and 129 for mattresses.

4. After my appointment as Chief of the Bureau, for 15 years I was responsible for all administrative and technical functions of the Bureau. During this time I continued to be actively involved in flammability and fire research and authored a number of full-scale fire tests for products intended primarily for use in public buildings, including Technical Bulletin 133 for seating furniture and TB 129 for mattresses and bedding systems.

5. Since 1974 I have authored or co-authored more than 260 papers and technical publications, most of which address issues related to the flammability of consumer products, such as upholstered furniture and mattresses and the components from which they are manufactured, such as polyurethane foam. In addition, I have authored a compendium of fire test methods, for mattresses and upholstered furniture, for the Sleep Products Safety Council (SPSC).

6. During my time as a government official with the State of California, for 30 years I regulated the polyurethane foam industry. Suppliers and users of polyurethane foam irrespective of the point of manufacturer were required to hold a license with the State of California to manufacture and sell flexible and rigid polyurethane foam and products containing polyurethane foam in the state of California for applications related to the their use in furnishings and as thermal insulation.

7. My dealings with the polyurethane foam industry commenced in the early 1960's. Polyurethane foam first became a product that was widely used in California, and throughout the United States, in the early 1960's. From the inception of the use of polyurethane foam, the significant flammability problems with polyurethane foam were well known and clearly documented.

8. Flexible polyurethane foams are organic materials that contain an open cell porous structure. As a result polyurethane foams contain an extremely high surface area. These factors result in a product with extraordinarily dangerous flammability properties. The severe problems presented by non-flame retardant polyurethane foams have been well know to the plastics and polyurethane foam industries for several decades.

9. While flexible polyurethane foam can be manufactured in a wide variety of shapes, densities, and other physical properties, including flame retardancy, flexible polyurethane foams of the non-flame retardant type involved in the Station Night Club fire ignite easily, burn vigorously once ignited, produce copious amounts of thick smoke and toxic gases, and may melt into a liquid that will drip and flow as it continues to burn. The extremely hazardous, and well known, fire properties of polyurethane foams result in fires that propagate rapidly to the point that it almost impossible to readily extinguish or control the fires.

10. Problems related to the severe flammability hazard of flexible polyurethane foams are not unknown – they have been known for decades, in fact since the first commercial applications of polyurethane foams in the late 1950's and early 1960's. The extreme flammability hazard of polyurethane is so great that the fire properties of polyurethane foam have often been referred to as "Solid Gasoline".

11. Since the early 1960's government officials and regulators have been concerned with the flammability hazard posed by polyurethane foam. Because of

this concern the use of non-flame retardant polyurethane foam has been severely restricted for many applications in the United State, as well as in other countries. For many years government standards and test methods related to the flammability of polyurethane foam have been published for use in applications such as motor vehicles, aircraft, carpet underlay, upholstered furniture, ships, building insulation etc.

12. Concern for the flammability of polyurethane foam is not restricted to the United States. Many of the standards for the products listed above are in fact international standards. It has been estimated that in the past 40 years that more than fifty (50) flammability test methods have been developed to address various aspects of the flammability of polyurethane.

13. The problems of the flammability of polyurethane foam have been well known to the plastics industry, and to manufacturers and suppliers of polyurethane foam, at least since the 1960's. For years major corporations marketed polyurethane for use in homes and commercial buildings as "non-burning" and "self-extinguishing", based upon meaningless small-scale fire tests, and despite abundant evidence to the contrary. A Federal Trade Commission Consent Degree in 1974 banned such representations, and required the plastics industry to more truthfully represent the fire performance of polyurethane foam and other plastics.

14. Flexible polyurethane foam of the type used in the Station Night Club, without fire retardants, is a highly combustible material that has been known for decades to be extremely flammable, and which Ignites very easily - typically in one second or less from a small open-flame ignition source such as a match. Once ignited polyurethane burns very rapidly, with great energy, and a high rate of heat release, and liberates large quantities of smoke and toxic combustion products while burning. This combination of heat smoke and toxic gases is often incapacitating in a matter of seconds, and is often fatal.

15. Polyurethane foam has a high heat release rate. That is, it burns with great energy. Because the rate of heat release is so high, non-flame retardant polyurethane foams can rapidly create "flashover" conditions in an enclosed space such as a home or a nightclub. "Flashover" occurs when the fire conditions in a room or enclosure become such that all exposed combustible materials ignite. Given the extremely easy ignition of non-flame retardant polyurethane foam, along with the rapid fire development cause by the high rates of heat release, untenable life threatening conditions are created rapidly.

16. Because of the extremely rapid manner in which non flame retardant polyurethane foam burns, in my opinion it should not be used in **any** application where a known fire hazard exists, or where fire is of the slightest concern. I have personally authored several publications warning of the dangers of polyurethane foam, and specifically urging that non-flame retardant flexible polyurethane foam not be used in any application where the slightest danger of fire exists.

17. In my capacity as a government regulator, in an article published in Fire Journal May/June 1988, titled "Should Polyurethane Foam Be Banned – A view from California", I put the polyurethane foam industry on notice that in my opinion non-fire retardant polyurethane foam "should not be used in **any** application where a known fire hazard exists, or where fire is of the slightest concern."

18. At the Polyurethane Foam Association's Fall Conference in New Orleans, on October 29 –30, 1987, where the PFA selected me as their "Man of the Year", I also warned of the fire hazards of non-flame retardant polyurethane foam, in a presentation titled, "Polyurethane Foam – Should It be Banned".

19. I have conducted hundreds of full-scale fire tests of flexible polyurethane foam, of products containing non-fire retardant polyurethane foam. Testing such products is highly dangerous due to the easy ignition of these products, the almost explosive flame development, the extremely high rate of heat release, and

the liberation of vast quantities of smoke and toxic combustion products. My testing has shown that the high energy release of flexible polyurethane foam and products containing non fire retardant flexible polyurethane can, if adequately ventilated, flashover a normal room in a typical residence in less than five minutes from the time of initial open flame ignition.

20. In the early stages of a fire, a small or limited amount of smoke can give a visible warning that something is wrong and that potential danger exists. However, a large volume of dense, black, toxic smoke presents a major safety hazard in that it physically obscures visibility, impairs visibility physiologically, and can cause panic and disorientation and inhibit the ability to escape from quickly developing life-threatening conditions. Also smoke causes people to choke, inhale large quantities of toxic gases and become physically incapacitated, thus prevent escape.

21. Flexible polyurethane foams with modified and improved flammability properties, have been available since the 1960's. I have personally performed flammability tests on thousands of samples of flame retardant polyurethane foams since 1968, and large quantities of fire retardant foams, of many levels of flame resistance, have been available, and sold, in the United States for many years.

22. The polyurethane foam industry is very aware of the severe flammability problems presented by non-fire retardant polyurethane foam. Industry statistics show that by 1970 about 21 million pounds of fire retardant flexible polyurethane foams were manufactured for sale in the U.S. This percentage has increased rapidly, by 1972, about 140 million pounds of FR foam was sold, which increased to 570 million pounds by 1975, and it is estimated that by 1992 over 50 percent of the flexible polyurethane sold in the U.S. contained flame retardants. The development of flame retardant foam in the 1960's is clearly established in the literature. In addition, numerous fire test procedures for evaluating the fire

performance of FR polyurethane foam were promulgated in the 1960's and early 1970's.

23. For decades, the polyurethane foam industry has recognized that certain applications and locations of use of polyurethane foam were "high risk" because of the fire characteristics of polyurethane foam. Some high-risk applications involved the use of polyurethane foam in prisons, hospitals, nursing homes, places where rapid exit in the event of fire may be difficult, places at a higher risk for arson, and places of public assembly such as auditoria, hotels and nightclubs. The extreme danger of non-flame retardant polyurethane foam in such places, and the magnitude of the potential harm in the event of fire, has been well recognized. Consequently, the foam industry has also long recognized that the fire performance characteristics for polyurethane foam products used in such high risk locations should be of a much higher standard than non-flame retardant polyurethane foam.

24. Sophisticated polyurethane foam producers, such as General Foam Corporation, typically produce many different and varied foam formulations. These formulations may differ in many ways including density, hardness, color, type of chemistry, airflow, fillers, fire retardancy etc. Where and how the foam and end products are to be used dictate the different foam characteristics, including fire performance. Risks vary among various types of occupancies and even within certain occupancies. In order to provide a product that meets the physical and safety needs of the occupancy and product in which it will be used, it is essential that foam producers are fully aware of all of the possible and potential applications of the foam that they produce. To achieve this objective it has been my experience that foam producers work very closely with their customers and users of foam to ensure that appropriate formulations of foam are provided for the known and foreseeable end use applications. Major foam producers such as General Foam Corporation employ marketing and sales staff whose responsibility it is not only to generically sell foam, but also determine the

specific needs and foam usage of their customers, and to ensure that the correct type of foam is provided to meet all of the customers needs.

25. It is clearly foreseeable to foam producers that the polyurethanes they make will be used in many and varied applications and occupancies. In my presence polyurethane manufacturers have testified to legislative bodies that their products are used in 1000's of applications. The foam industry clearly knows that the polyurethane foam they make is a pervasive product in our society. The foam industry clearly knows about the fire hazards of the products that they make, and of the critical importance of providing products that fully meets the safety needs, including fire safety, of every application in which their foam will be used.

26. A U.S. Fire Administration reports shows that in 2000 more than 1,500 reported nightclub and bar fires occurred, although many more smaller fires (for example cooking or smoking fires) may have also occurred but were extinguished by nightclub staff and not reported to the local fire department. Nightclub fires have the potential to cause high fire casualties due to maximum or over-capacity crowds, especially on weekends, during life music performances, or because of special events or promotions. In the event of a fire, there is a very significant risk that a full or over capacity crowd would panic or would otherwise have difficulty completely exiting.

27. One of the common and well-known uses for which flexible polyurethane foam is manufactured and sold is as a sound absorption or "sound proofing" material. Flexible polyurethane foam is often depicted in photographs of acoustical laboratories, anechoic chambers and professional and amateur recording studios. The polyurethane foam so depicted often has an "egg crate" convolution to it, which may assist in its sound dampening qualities, and probably provides am ore pleasing esthetic appearance for this application. This egg crate

form is one that is familiar to the general public. This egg crate convoluted form is extremely similar if not identical to the egg crate convolutions frequently seen in flexible polyurethane foam used as a packaging medium, and for decubitus pads to prevent bedsores. Indeed the flexible polyurethane foam used for packaging would have similar sound dampening qualities as polyurethane foam sold specifically for acoustical purposes.

28. The flexible polyurethane foam manufactured and sold for acoustical dampening purposes would typically contain a flame retardant and be of a different chemical composition, and would usually be used in a facility in which there is built-in fire protection, usually automatic sprinklers. However, there would be no way for the general public to distinguish between flame retardant flexible polyurethane foam and the non-flame retardant variety. Indeed, there is a substantial likelihood that such a person would not be able to distinguish between flexible polyurethane foam used for packaging and foam that is similar in appearance but used for acoustical dampening purposes.

29. The public media in the United States, and in the UK, have put the plastics industry, including manufacturers and suppliers of polyurethane foam on notice regard the severe fire hazard and extreme dangers presented by polyurethane foam.

30. In 1979 the **Los Angeles Times** alerted the industry and the public to the fire problems of polyurethane foam when a series of articles were published by Times staff writers Gaylord Shaw and Robert Gillette. The authors entitled this important series of articles **"Solid Gasoline in Fires - Urethane: A Deadly and Pervasive Peril".** After a four-month investigation the authors came to the following conclusions:

"Urethane is inherently flammable. Fire investigators call it "solid gasoline." Although its flammability varies from one formulation to another,

most formulations burn hotter than wood and twice as fast. Urethane melts and flows as a flaming liquid and generates dense smoke and toxic gases."

"There is reason to believe that urethane is involved in at least 1,000 of the nation's 8,000 to 10,000 fire deaths each year."

"A Times investigation found that urethane's flammability problems have been known within the plastic's industry for at least two decades, and within segments of the insurance industry and the federal bureaucracy for nearly as long - but that even today the consuming public has little knowledge or appreciation of the potential hazards."

"One executive of a major chemical company, who asked not to be identified, told the Times that he thought the estimate of 1,000 annual fire deaths involving urethane was conservative."

"Urethane burns so readily that fire safety researchers sometimes use it as a standard test fuel."

"Urethane's severe flammability was known to its manufacturers, who included some of the world's largest and most sophisticated chemical companies, two decades ago when the boom in sales began."

"In 1968, for example, the Factory Mutual Research Corp., an insurance organization in Norwood, Mass., found that in 32 of 39 warehouse fires in the previous three years, stocks of flexible urethane and products containing it had burned with alarming ferocity. In a report entitled "Foamed Polyurethane: The Solid That Burns Like a Flammable Liquid," Factory Mutual warned its industrial clients to take special

precautions in storing urethane, declaring it "is a special problem, in that it has higher flammability than other similar material"".

31. In the past 40 years there have been thousands of fires, hundreds of casualties and millions of dollars of property lost in which untreated polyurethane foam has been one of the primary fuels involved. The hazards of rapid fire growth, high rates of heat release, heavy dense black smoke and toxic products of combustion have been well known to the plastics industry since the 1960's. The extreme hazards associated with foam plastic and its potential misuse was foreseeable and known or should have been known by the plastics industry. However, these hazards are generally not known by the general public, who rely on sophisticated manufacturers and suppliers of polyurethane foams to provide safe products.

32. The polyurethane foam industry, and particularly sophisticated manufacturers such as General Foam Corporation, have for decades had specialized knowledge of the extreme flammability hazard of the type of polyurethane foam present in "The Station" at the time of the fire. The general public, however, does not possess this specialized expertise and knowledge. Therefore the hazardous nature of flexible polyurethane under fire conditions is not known or obvious to the public.

33. Polyurethane foam used as an interior finish has been the primary fuel load in fatality fires in places of public assembly for decades now. As a result of these deadly fires, and recognizing the likelihood of the use of this product, lightweight polyurethane foam has been regulated by codes and standards and is not allowed as an interior finish. Despite the dangerousness of this product as an interior finish, there have been repeated, highly publicized instances of the misapplication of polyurethane foam products as interior finishes of places of public assembly which were involved in fire, and the presence of the product was either the primary fuel load or a significant contributor to the fire.

34. Flexible polyurethane foam was manufactured by General Foam and it was sold in bun form to American Foam. American Foam then cut the foam, giving it its "egg crate" convolutions, but did not otherwise alter, modify or incorporate it into any other product; that is, American Foam sold to the owners of the nightclub the exact same product that it had received from Foamex or its predecessor, with the only change being the cutting of the bun into smaller pieces with the egg crate convolutions This cutting did not result in any relevant or material change in the product or its characteristics; its fire characteristics and its inherent dangerousness was not changed in any material degree as a result of this cutting and shaping.

35. Related to the above captioned matter I have reviewed the Affidavit of Margaret Hebner.

36. Polyurethane foam is never used in the physical form in which it is produced during the manufacturing process. As pointed out in paragraphs 5 – 8 of the Affidavit, polyurethane foam is generally supplied to users in large buns. These large buns are always cut by either the end user, or by foam fabricators, to achieve the specific dimensions needed in the end use application. Convoluting, or creating dimples, in foam is a common practice. In addition to packaging foam, convoluted foam is widely used in products such as mattresses, furniture and in decubitus pads to prevent bedsores. Convoluting merely changes the polyurethane foam from one physical structure and dimension to another. Performing the convoluting procedure in no way remanufactures the foam or changes any of its chemical or basic flammability properties.

37. Paragraph 8 of Ms. Hebner's Affidavit, which indicates that "AFC must remanufacture the bulk polyurethane foam .....", seems to imply that AFC does something to the foam that may intrinsically change the flammability properties of the foam. If this is the intent – it is not factual.

38. Every polyurethane foam manufacturer, including Foamex Corporation and General Foam Corporation, knows that the bulk product that it sells will be cut, sliced and / or convoluting into a variety of physical configurations. This is the normal custom and practice in the industry.

GORDON DAMANT

STATE OF CALIFORNIA
COUNTY OF SACRAMENTO

SUBSCRIBED AND SWORN to before my by Gordon Damant on this 5th day of October, 2004.

RANJLYN L. SHARMA
Commission # 1394297
Notary Public - California
Sacramento County
My Comm. Expires Jan 16, 2007

Notary Public
State of California

My Commission Expires: Jan 16, 2007