

# The Presidential Green Chemistry Challenge Awards Program: Summary of 2007 Award Entries and Recipients

## *Environmentally and Toxicologically Safe Firefighting Gel*

Liquid firefighting gel had its genesis in the 1990s, when John Bartlett, President of Barricade International, Inc., observed that used, disposable baby diapers survived a house fire. The superabsorbent polymer and water content of the diapers prevented their combustion. Mr. Bartlett, a professional firefighter, realized that a superabsorbent polymer might change the way fires are fought. He then looked for liquid forms of the superabsorbent polymer that might be easily introduced into firefighting water to produce a fire retardant and suppressant gel.

In the late 1990s, Mr. Bartlett identified a printing paste thickener used in the textile industry that produced a thickened water gel that significantly improved fire extinguishing and prevention. Barricade's competitors now use that product, but it contains two components, petroleum distillate and nonylphenol ethoxylate (NPE), that have environmental and health concerns. Data have linked NPEs to endocrine disruption and mammalian reproductive concerns.

Barricade International, with E.T. Sortwell conducting R&D, has developed a product to match the firefighting properties of the existing gel without its environmental and health concerns. The product is Barricade II, a dispersion of superabsorbent polymer in food grade vegetable oil (i.e., canola), sorbitan monooleate, and fumed silica. The superabsorbent polymer is typically a copolymer of acrylamide and acrylic acid derivatives such as salts. Barricade II is more effective at fire prevention than its NPE-petroleum distillate competitor. In aerial applications, Barricade costs only about half as much as traditional retardants and is effective at about 1/18 the application rates. The U.S. Forest Service has placed Barricade II on its Qualified Products List. A U.S. patent has been allowed, and Barricade International has begun full-scale commercial production of this product. California's Department of Forestry used Barricade II in aerial applications during the 2006 fire season with spectacular results.

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