

Making the Move to Fluorine-Free in Hangar Operations

by John Demyan

Reviewing over 90 years of history, Lehigh Valley International Airport (ABE) is no stranger to being a takeoff point for innovation in U.S. aviation. Recently, ABE embraced another opportunity to be an industry leader, when we decided to make Hangar 11 the first and largest hangar in the nation to protect itself with fluorine-free fire suppressant foam.

In 2018, the Lehigh Northampton Airport Authority (LNAA) was in the process of building a new 54,000-square-foot hangar designed to accommodate general aviation aircraft, modern corporate jets and helicopters. This \$16.3 million facility would be the Authority's eighth bulk hangar at ABE and the first new hangar built since 2006. An important component of this project was the implementation of a fire safety system – using the technology and regulations surrounding fire-fighting foam which had changed over those dozen years.

The Authority worked with C&S Companies of Syracuse, NY in developing the engineering plan for the fire safety sprinkler system. Based on the Pennsylvania Uniform Construction Code (UCC) and various NFPA requirements, the system that was developed featured:

a. Two (2) 2,600-gallon horizontal bladder tanks (one main/one spare).



Two 2,600-gallon bladder tanks containing a total of 5,200 gallons of RE-HEALING 3% Fluorine-free foam.

b. 5,200 gallons of a 3% fire suppressant

foam concentrate.

c. Seven (7) proportioners and hardware supplying foam to the overhead sprinklers and hose reels.

d. Five (5) hose reels located throughout the Hangar for Fire Department use.



Foam-water deluge systems protecting the entire hangar floor space. Each deluge system protected an area over 9,000 square feet each.

In addition, the original design specified six (6) open head foam deluge systems protecting the hangar space from overhead. All the deluge systems were to be identical in size and layout, with each featuring 90 open pendent sprinklers. The overall design required five of the six systems flowing with two hose reels. The total demand was for 7,856 gallons per minute (gpm) - roughly 1,547 gpm for each of the five systems operating and a 120 gpm for two interior hose reels. The system would be connected to the public water system with four 2,500 gpm fire pumps for boosting water pressure. The fire suppressant foam specified for the product was a standard 3% aqueous film-forming foam (AFFF) designed for use with hydrocarbon fuels.

Even after plans are approved, the importance of ongoing research can continue to shine a light on other potential options that deliver an even higher level of safety and service.

Around the world, fire suppressant foams based on certain per- and poly-fluoroalkyl

substances (PFAS) were being replaced due to increased regulatory pressure. The anticipation was that if these materials were to become more strictly regulated, we would be faced with dramatically higher costs to address clean up and disposal moving forward. We noted the actions within our industry in places like Australia and Europe where these foams were effectively banned.



Four 2,500 gpm electric fire pumps were installed and supplied by a new 16" ductile feed into the building.

While regulations in the United States have not reached the point of banning these materials, the Airport Authority decided to study fluorine-free fire suppressant foams for use in our new hangar to see if we could optimize our project operations. Perimeter Solutions, a supplier of fire retardants and suppressants and specifically fluorine-free chemistry recommended their SOLBERG® RE-HEALING RF3 3% Class B Foam Concentrate, which has been on the market since 2010. SOLBERG RE-HEALING foam concentrates are fluorosurfactant, fluoropolymer-free products for use on Class B hydrocarbon fuel fires.

Three questions regarding the use of this technology were examined:

1. Was the performance adequate to the firefighting task?
2. Would these foams work within the systems that were already under design for our hangar?
3. Would there be a dramatic cost difference between the two technologies both in required hardware, foam concentrate price, or replacement cost due to product shelf life?

Addressing the performance and compatibility issues, SOLBERG RE-HEALING RF3 had been tested to the performance criteria of UL Standard 162. UL-162 (Foam Equipment and Liquid Concentrates) is a worldwide-recognized standard for testing firefighting foam concentrates. The main difference with other

standards for foams is that UL-162 not only describes a fire testing method for foam concentrates but also a compatibility confirmation between all the components that are present in the chain from the manufacturing process to the final use of the product; compatibility with drums, proportioning tests, foam quality tests, marking, etc. are subjected to the standard. SOLBERG RE-HEALING RF3 also had extensive UL Listings for bladder tanks, proportioners, foam chambers, foam makers and fire sprinklers including those specified in our original hangar fire suppression system design.

From a hardware and foam cost standpoint, the old technology and the new were nearly identical. The shelf life of the various Class B foams are comparable, however, we also considered that fluorine-free foam is a more long-term sustainable solution.

Our request to switch fire suppression system foams earned unanimous approval from the Airport Authority Board of Governors. As an organization, we are proud of this decision to enhance the protection of our hangar, our people, our firefighters, and the environment, while getting our project done on time and on budget.

The hangar project at ABE was officially completed in July of 2020 with the delivery and loading of 5,200 gallons of innovative environmentally sustainable fluorosurfactant and fluoropolymer-free firefighting foam concentrate from SOLBERG.

About the Author: John Demyan joined the Lehigh-Northampton Airport Authority (LNAA) in 1991, serving as a full-time firefighter before achieving the ranks of Lieutenant, Captain, and named Fire Chief. The Aircraft Rescue and Firefighting (ARFF) Department at Lehigh Valley International Airport (ABE) employs 6 full-time and 8 part-time



firefighters / emergency medical technician (EMT). John started his emergency services career as a volunteer firefighter over 38 years ago (1982) with the Hanover Township Fire Department while attending classes at Northampton Community College Emergency Services program.

