

Four foam hand-lines were used at various stages of the operation. Haz-Mat Company 1 employed Pyrocool, the first-ever use by the FDNY. Once the foam lines began operating, the fire was controlled in seven to eight minutes. See the accompanying sidebar on this product on page 24 by Lieutenant Ed Connelly.



light poles.

Exposures included the Mobil gas station, approximately 50 yards east and downhill from the burning tanker. Meeker Avenue and the elevated BQE are 25 yards to the south. On the west side is the continuation of the entrance ramp to the BQE, running in an uphill direction. To the north is a wooded lot, roughly 40 yards wide, with 11 row frames on the far side.

First-arriving engines took hydrants and supplied a tower ladder and aerial ladder pipe, which operated into the wooded lot, protecting the row frames from radiant heat and flying brands from the burning trees. Less than a minute later, with the arrival of the first Battalion Chief, a second alarm was transmitted, along with a 10-86 signal (see sidebar), calling for the maximum

amount of fluoro-protein foam. Two foam hand-lines were positioned between the Mobil station and the flowing gas.

With a sewer grate approximately 20 yards downhill of the tanker and the contour of the road--channeling most of the gasoline, which makes it beyond the sewer to the south of the gas station, the dispatcher was notified that the Command Post and exposure #1 would be the gas station. One tower ladder and an engine were assigned to remain up on the BQE and the NYPD was requested to stop traffic on the Expressway. At this time, a panicked employee of the gas station activated the dry chemical system protecting the gas pumps, creating a white, acrid cloud that hung in the air for a time, encircling the Command board and units in the vicinity. Three companies were assigned to monitor the row frames and two additional Battalion Chiefs were requested.

Four foam hand-lines were used at various stages of the operation and Haz-Mat Company 1 applied a pilot program foam, Pyrocool (see sidebar on page 24), simultaneously with the fluoro-protein foam. Once the foam-lines had begun operating, the fire was controlled in seven to eight minutes. The 10-86 call for the maximum amount of fluoro-protein foam then was changed to a 10-86 no code and the Department of Transportation was called to cut the power to the light posts.

There was still a flow of gasoline from the half-melted tanker. With the level of radiant heat diminished, the sewer grate could be approached and a dam was constructed to prevent further contamination of the sewers.

Due to extreme heat, it took more than 30 minutes from the time of the original Box, to confirm visually that the driver hadn't made it out of the cab. At this point, there was little purpose in taking any risk in removing him and this was not done until the recovery truck vacuumed out the

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Foam Needs

Without time to calculate exact foam requirements at most operations, the following is a rough outline for foam requirements.

- Rule of thumb, which is slightly higher than the NFPA recommendation, is .2 gpm of foam solution per square foot of surface area.
- Minimum application time is calculated at approximately 20 minutes for spills and 60 minutes for tank fires.
- A quick formula for the minimum amount of foam needed: Square footage x .2 x .03 x 20 (for a spill) or 60 (for a tank fire) = minimum concentrate needed on hand.
- Square footage of a spill area or tank x .2 will provide foam solution needed in gpm. Multiplying this number by .03 converts foam solution into concentrate in gpm. Multiplied by time of application, approximately 20 or 60 minutes.

A gas truck (with no spill) cut in half (one-half of this tanker melted) is approximately 35 feet long x eight feet wide (280 square feet).

- 280 x .2 = 56 gpm of solution
 - 56 x .03 = 1.68 gpm of concentrate per minute
- Multiplying this by the rule of thumb for tank fires (minimum 60-minute supply), equals approximately 100 gallons of concentrate needed. This amount will change if the tank fire should become a spill fire.

Another example: an 80-foot-diameter circular tank fire, after all the math, requires 1800 gallons of concentrate on hand in order to meet the minimum flow rates for 60 minutes.

These figures are all minimum requirements and do not take into account any spill or other condition that may have to be dealt with. The above incident was on an incline and would have covered a much larger area had the rate of the leak been high enough to overwhelm the sewer grate and spread beyond it.

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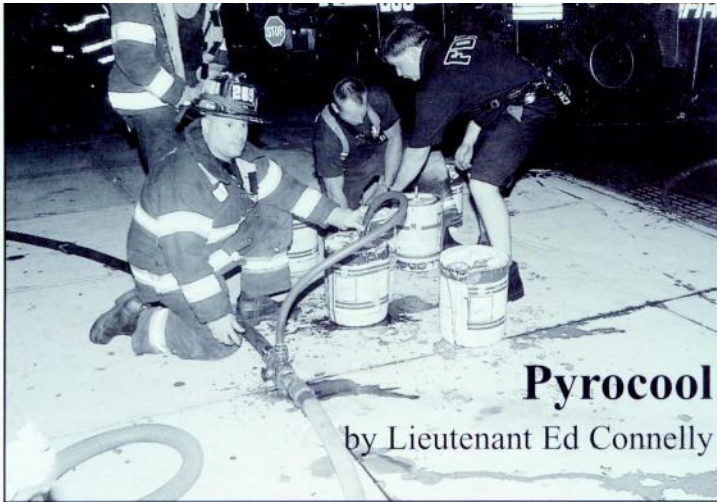
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Butler, Daniel
 Death Stalks the BQE
 With New York Firefighters
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Editor's Note: Pictured above, Brooklyn Box 151 afforded the FDNY the opportunity to try/test a new product--Pyrocool. The following information provides a brief introduction to this product.

When an MC407 overturned at Brooklyn Box 151 with 9000 gallons of gasoline, Pyrocool Fire Extinguishing Foam (FEF) was selected as a primary means of extinguishment because it offers a unique method of extinguishing petroleum fires. Conventional AFFF and fluoro-protein foams act to suppress and separate the vapors from the liquids, thus attacking the fuel component of the fire triangle. Conventional foams do not cool beyond the normal effect of the water they contain.

Pyrocool attacks the heat component of the fire triangle, as well as providing a foam blanket, which prevents flashback to the extinguished fuels. Pyrocool interferes with the oxidation process, absorbing high-energy radiant emissions from the combustion process. This allows the firefighters to approach more closely and attack the flames directly. Following extinguishment, structures adjacent to the fuel source are cool to the touch.

Unlike conventional foams that use a three- and six-percent solution, Pyrocool uses a .4 percent solution, which provides between 25 to 28 minutes of operation from a five-gallon container.

Pyrocool first gained attention in 1994 when it was used to extinguish a fire on the oil tanker *Nassia*, which was carrying 98,000 tons of crude oil. It also can be used on tire fires, bundled cloth, cardboard and flammable solids, such as magnesium.

Some other features of Pyrocool include:

- Ability to be used with fresh or salt water
- Ten-year shelf life
- Non-corrosive
- Biodegradable
- Compatible with other foams
- Ten to 40 percent faster knockdown

About the Author...

Lieutenant Ed Connelly is a 17-year veteran of the FDNY, the past four years of which have been with Haz-Mat Company 1. He holds a Masters degree in Occupational Health from Hunter College. Occasionally, he writes for WNYF on hazardous materials topics.

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remaining product.

In all, fewer than 100 gallons of foam concentrate were used. Of the 9000 gallons of gasoline this tanker carried, it is unknown how much burned and what quantity entered the sewer. Once the Department of Environmental Protection (DEP) arrived, FDNY's previous strategy of flooding the sewer was confirmed and implemented.

With a long delay--more than an hour--awaiting arrival of a sand truck to support the dam and more than two hours acquiring

the services of a vacuum truck, Haz-Mat 1 members began siphoning what was about to overflow from the dam, into several 85-gallon drums, which later were transferred by the recovery truck.

Lessons learned/reinforced

1. New York City regulations for gasoline trucks were pre-empted by federal statute in 1992. Since then, tankers can be aluminum and, limited by road/bridge weight restrictions, may carry nearly 9000 gallons (triple rear axles on some allow up to 15,000 gallons on the Interstate). Aluminum tanks, involved in accidents, exhibit more frequent and larger leaks than do steel tanks. The upside of the lower melting temperature of aluminum--approximately 1500 degrees--is the almost non-existent chance of a BLEVE. Compartmentation, though no longer required, still is used on the majority to enable different grade fuels to be hauled together.
2. The action by the Mobil station employee requires issuing a VO (violation order) to keep the station closed until the system is recharged.
3. After consulting with the DEP and DEC, it was suggested for future reference in regard to gasoline spills, immediate flooding--without awaiting their arrival, along with immediate notification to these agencies, in order to warn the treatment plant personnel of possible alarm activation in their plants.
4. When multiple agencies are on-scene--often with conflicting concerns--it is sometimes necessary, as the Incident Commander, to affirm responsibilities and authority. The Office of Emergency Management can be called upon to confirm this.

The 10-86 Code

Without a 10-86 code, a second-alarm assignment of eight engines and five ladders brings 170 gallons of fluoro-protein concentrate to the scene. This amount of foam concentrate could accommodate a combination of three 2 1/2-inch hand-lines with the 120-gpm foam nozzle for more than 15 minutes each.

The above statement and the chart below are presented only to provide a clearer perspective of the resources at hand and those that will arrive, not to advocate additional alarms rather than a 10-86 signal at foam operations. The number of units arriving on any 10-86 code, but especially on a code 1 or 2, may require one or more additional Chiefs, above the foam coordinator(s) assigned, just to organize the movement of units.

10-86	# of units*	Fluoro-Protein Concentrate**	Foam Solution	Foam Coordinators
No code	9	3200 (gallons)	106,666 (gallons)	1
Code 1	36	12,800	426,666	2
Code 2	24	6800	226,666	2
Code 3†	11	3200	106,666	1

* This number is in addition to units called prior or subsequent to the 10-86.
 ** This includes approximately 20 five-gallon cans on each carrier, but not the 15 gallons carried by each associated engine of the carrier and each bulk foam unit. † High-Expansion Foam Unit responds.

About the Author...

Deputy Chief Daniel Butler is a 22-year veteran of the FDNY. Currently, he is covering in the 11th Division. He has served in Ladders 170 and 18, as well as the 5th, 6th and 15th Divisions.

