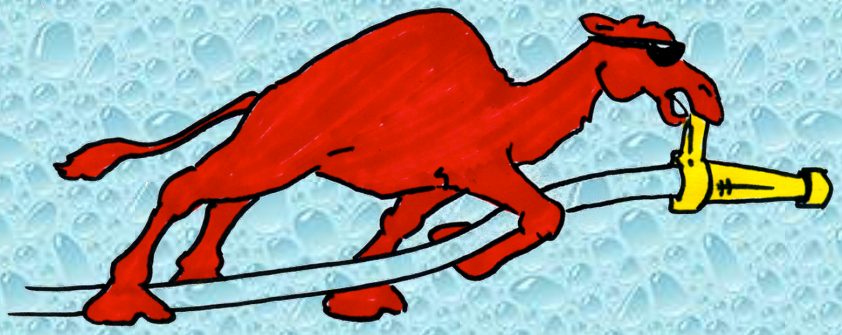
www.GotBigWater.com



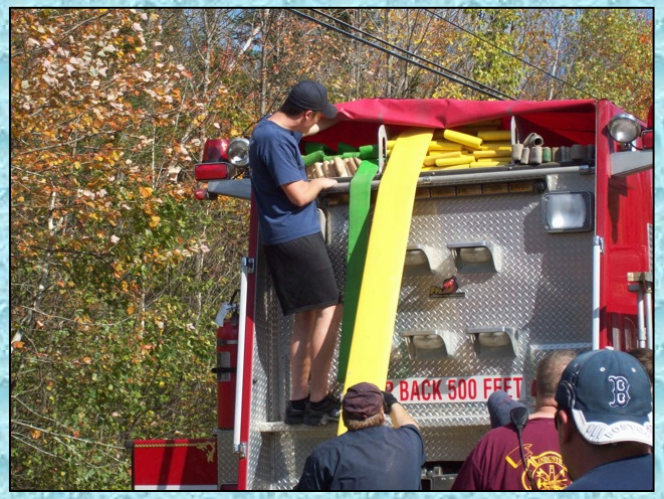
Franklin County Fireman's Association
Franklin County, Maine

Rural Water Supply Operations Seminar
Relay Pumping Drill – October 9, 2011
Summary Report

 Franklin County, ME - October 2011

The Purpose

- The purpose of the seminar and drill was to review the basics of large diameter hose and to practice a relay pumping operation in a non-hydranted setting.



 Franklin County, ME - October 2011

The Seminar

- The classroom session of the seminar was held at the Farmington FD and consisted of an “A to Z” review of LDH and relay pumping considerations.
- The practical session was held at an educational complex located in Farmington, Maine, where a couple thousand feet of LDH could be laid out with minimal impact on the community.

Water Supply Drill Participants

- *Drill participants were from eight different fire departments in Franklin County and the pumping apparatus was representative of the type of water supply support that would respond to a structure fire in Franklin County.*

 Franklin County, ME - October 2011

Briefing

Seminar instructor, Mark Davis, reviewed the basics of setting up a relay pumping operation and discussed the importance of communications, pump pressure settings, and apparatus positioning.

 Franklin County, ME - October 2011

Portable Pumps Used

To make the relay operation a bit more challenging, portable pumps were used to draft from a brook and supply water to a dump tank from which a 1,250 gpm pumper then drafted and supplied the relay operation.

 Franklin County, ME - October 2011

Portable Pumps for Water Supply

The drill was not a timed event – the focus was more on performance than on time. Above – crews carry the first portable pump down to the brook.

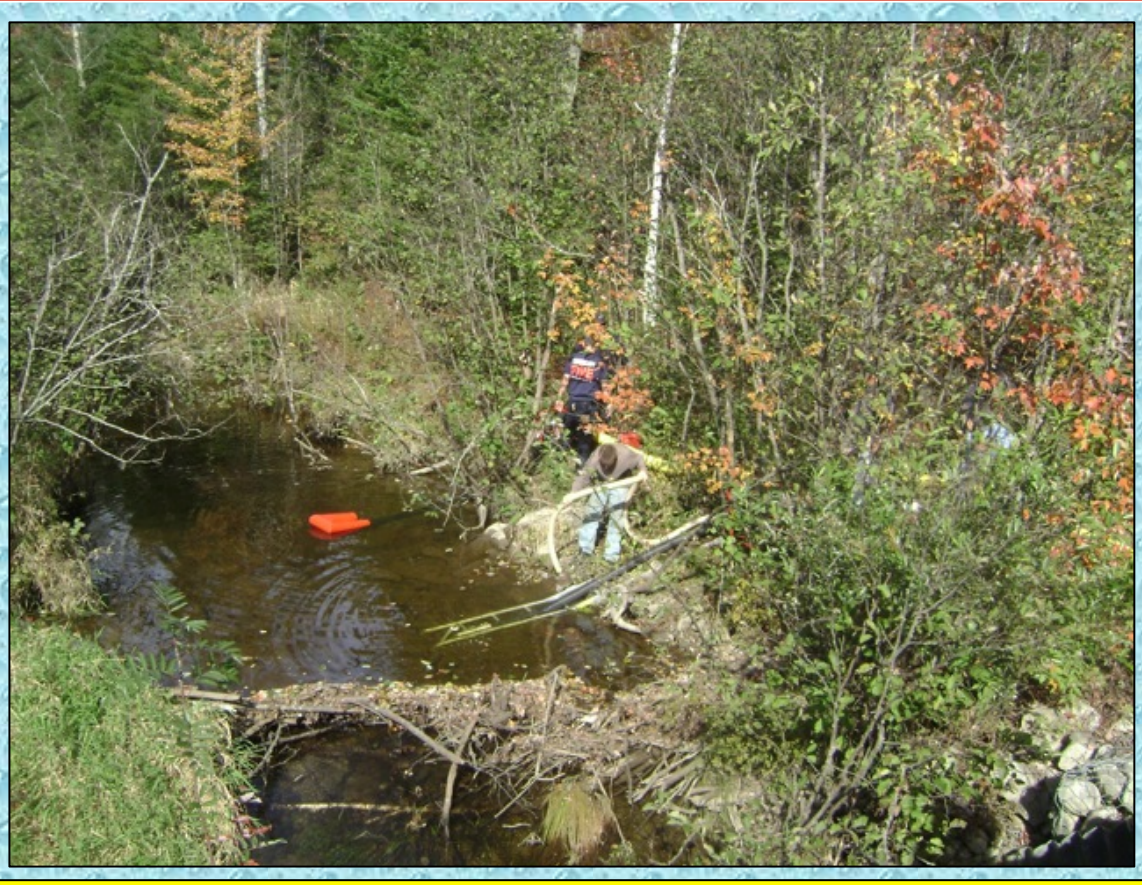
 Franklin County, ME - October 2011

Portable Pumps for Water Supply

One key to success with a portable pump is to minimize the lift. This 500 gpm pump is placed as close to the water source as possible. In addition, 5-inch hose is used to improve the discharge flow.

 Franklin County, ME - October 2011

Portable Pumps for Water Supply



Brooks and streams can be deceiving in terms of their looks and the flow available. This brook was able to easily support the 650 gpm flow used for this drill.

 Franklin County, ME - October 2011

Portable Pumps for Water Supply

Another key to success with portable pumps is to use 3” or 4” suction hose in lieu of 2-1/2” suction hose and, use a good quality strainer. The second pump used in the drill was the 400 gpm one shown above. It took water from the same brook as the 500 gpm pump.

 Franklin County, ME - October 2011

Portable Pumps for Water Supply

Each of the portable pumps discharged their water up a short incline through 100 feet of 5-inch LDH.

 Franklin County, ME - October 2011

Dump Tank Operations

The 5-inch LDH dumped directly into a 3,000-gallon dump tank. One of the lines fed a 10-ft section of 6-inch hard suction and the other line fed an LDH manifold. The use of the hard suction hose prevents kinking of the line.

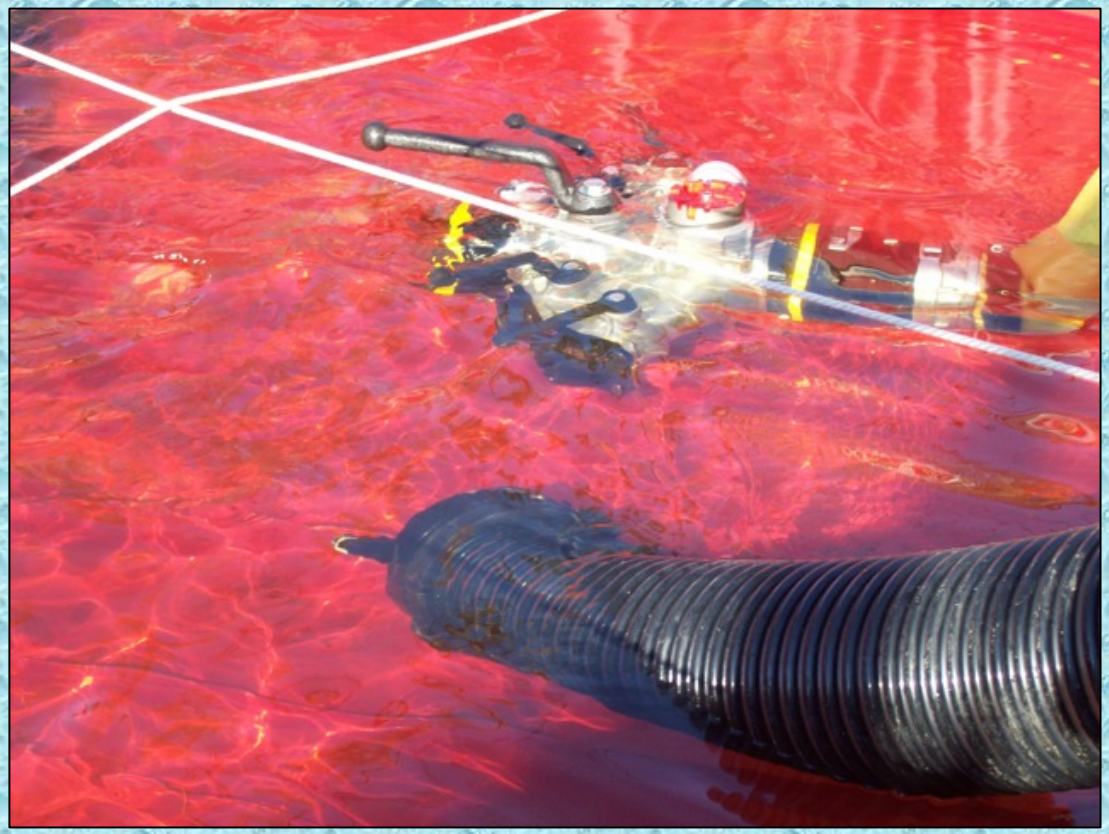
 Franklin County, ME - October 2011

Dump Tank Operations

Of course, in order to use the hard suction hose, the correct adaptors are needed. An important safety point, when using hard suction as shown above, the opposite end of the hose MUST be left “open” so that the suction hose does not become pressurized.

 Franklin County, ME - October 2011

Dump Tank Operations



An LDH manifold was used on the other 5-inch line. The manifold helped anchor the hose while providing a means for flow into the dump tank. However, the 5-inch hose did kink some where it crossed over the edge of the dump tank.

 Franklin County, ME - October 2011

Relay Pumping

With the water supply established, Farmington Engine 2 (1,500 gpm) lays out 700 feet of 5-inch hose and takes a position as the first relay pumper.

Relay Pumping

The supply line was broken and connected to the officer's side piston intake valve. The next pumper, Jay Engine 1, began its lay of hose. That hose was initially connected to the Farmington pumper's rear discharge.

 Franklin County, ME - October 2011

Relay Pumping

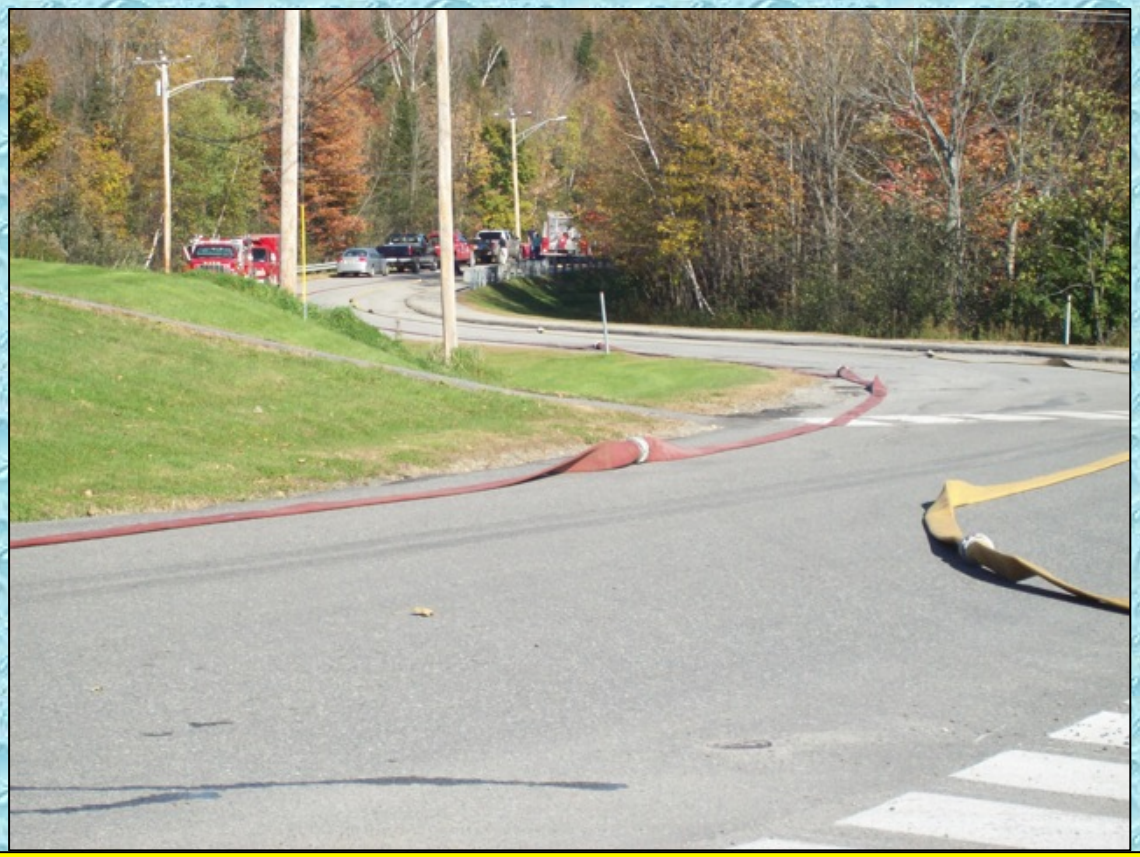
After some discussion, the hose feeding the Jay pumper was moved from the rear discharge of the Farmington engine to the officer's side discharge. This move provided a greater flow ability – the rear discharge would have been more restrictive.

Relay Pumping

Jay Engine 1 (1,250 gpm) begins its lay of 1,000 feet of 4-inch LDH from Farmington Engine 2.

 Franklin County, ME - October 2011

Relay Pumping



When laying out LDH, it is important to try and lay it so that vehicle access is not impeded. This is not hard to do – one just has to remember to do it!

 Franklin County, ME - October 2011

Dump Tank Operations

Temple Engine 3 (1,250 gpm) moves into position as the supply pumper and begins setting up for drafting operations out of the dump tank.

 Franklin County, ME - October 2011

Relay Pumping

After laying out 1,000 feet of 4-inch LDH, Jay Engine 2 becomes the second relay pumper.

 Franklin County, ME - October 2011

Relay Pumping

Engine 2 took in the supply via the piston intake valve with intentions of discharging via the high-flow discharge. The problem that arose was that Engine 2's piston intake relief valve was set at 70 psi (brand new valve) and the only way to make an adjustment was to remove the entire valve from the suction intake.

 Franklin County, ME - October 2011

Relay Pumping

The decision was made to switch intakes and take the supply line directly into the driver's side suction inlet – however, there was NO external relief valve so intake relief was dependent on the Farmington pumper operator controlling his discharge pressure.

 Franklin County, ME - October 2011

Relay Pumping

After having laid 600 feet of 5-inch LDH, Strong Engine 1 (1,250 gpm) became the attack pumper and flowed a TFT Blitzfire device.

 Franklin County, ME - October 2011

Relay Pumping

The supply line was taken directly into the officer's side suction inlet and water was discharged via 50 feet of 3-inch hose to the Blitzfire.

 Franklin County, ME - October 2011

Relay Pumping

The plan was for the supply pumper and relay pumpers to each discharge the same pressure and the attack pumper would utilize all available incoming pressure in order to maximize flow.

Water Flow Measurement

In order to accurately measure flow, the Blitzfire was changed out with a Hose Monster flow diffuser equipped with a fixed pitot tube.

 Franklin County, ME - October 2011

Relay Pumping

As with any pumping operation, the pump operator is a critical component in the success of the operation. At this drill , communications were important because four pump operators were trying to coordinate flow operations.

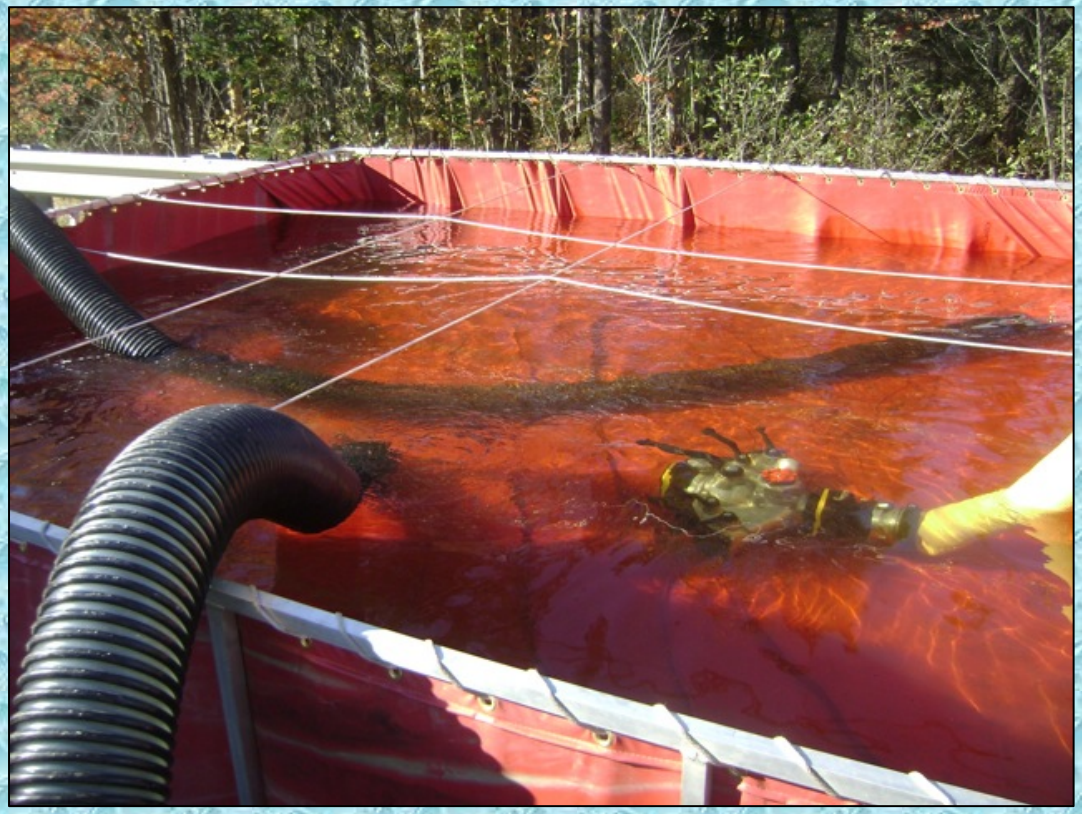
 Franklin County, ME - October 2011

Relay Pumping

The relay was set up to test several discharge settings: 75 psi, 100 psi, 125 psi, and 150 psi. The 150 psi discharging setting on the supply and relay pumpers yielded a flow of 631 gpm – which was the highest flow achieved.

 Franklin County, ME - October 2011

Relay Pumping



During the peak of flow at the attack pumper (Strong E1), the portable pump supply operation was able to keep up with the demand.

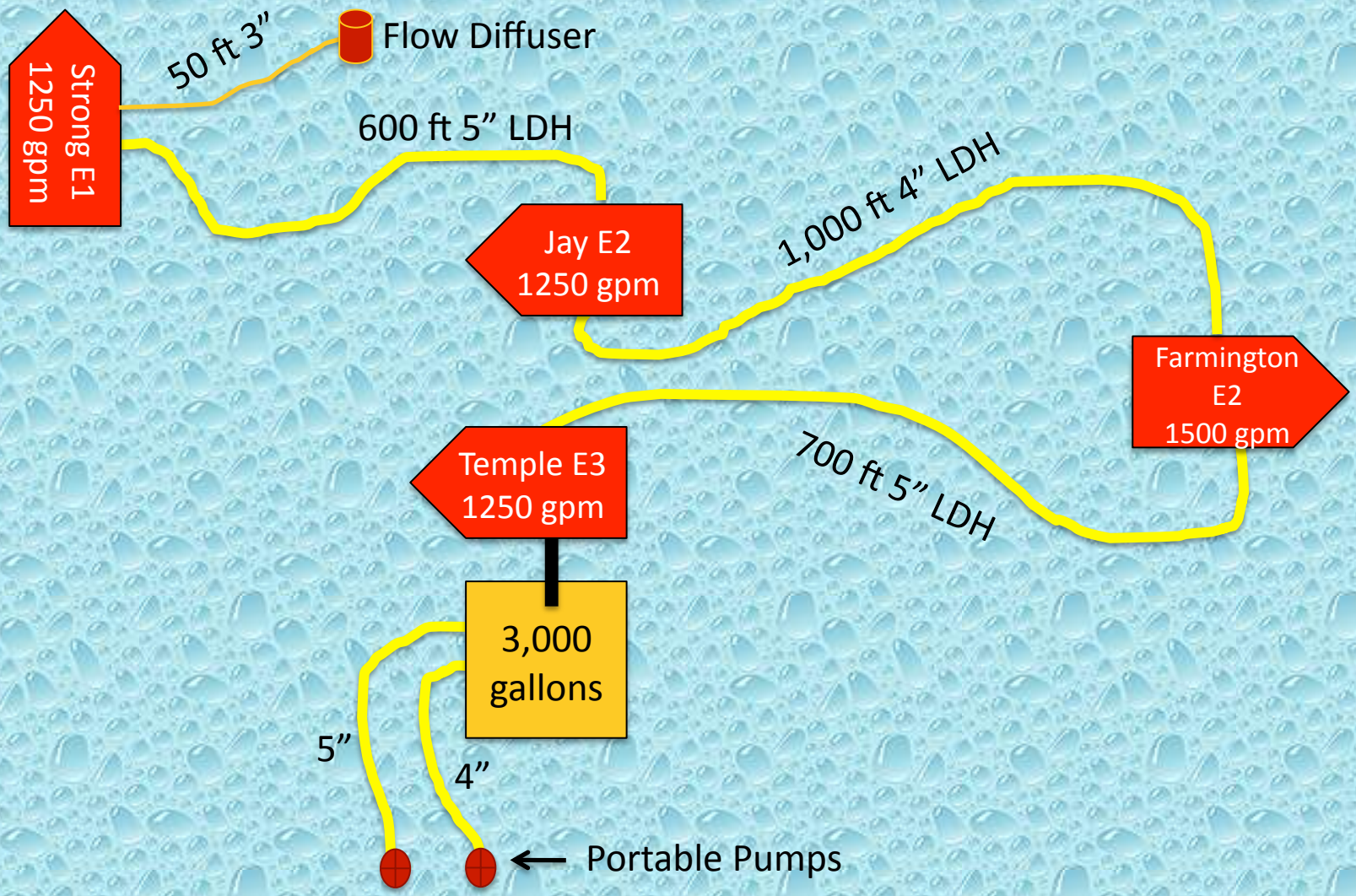
 Franklin County, ME - October 2011

Relay Pumping

Had the portable pumps been connected directly to the supply pumper, cavitation of the supply pumper most likely would have occurred. But…by feeding the dump tank from the portable pumps, the supply pumper was able to draft and support a much higher flow rate.

 Franklin County, ME - October 2011

Relay Pumping Layout



 Franklin County, ME - October 2011

The Results

- With the supply pumper and two relay pumpers pumping at a discharge pressure of 75 psi, water flow was not sustainable. All of the pumpers suffered from cavitation and collapsed intake lines.
- With the supply pumper and two relay pumpers pumping at a discharge pressure of 100 psi, a flow of 533 gpm was sustained at the attack pumper.

The Results

- With the supply pumper and two relay pumpers pumping at a discharge pressure of 125 psi, a flow of 584 gpm was sustained at the attack pumper.
- With the supply pumper and two relay pumpers pumping at a discharge pressure of 150 psi, a flow of 631 gpm was sustained at the attack pumper.

The Results

Relay Operating Pressure	Flow Achieved
75 psi	0 gpm
100 psi	533 gpm
125 psi	584 gpm
150 psi	631 gpm

*Relay Operating Pressure = discharge pressure of the supply and relay pumpers

The Lessons Learned

- Portable fire pumps can play an important role in accessing water supplies that a normal FD pumper cannot access.
- Combine those portable pumps with the use of LDH and larger suction hose and significant gains can be made in terms of flow improvement.
- Using a dump tank to collect water from a portable pump provides a means by which increased flows can also be achieved during drafting operations.

The Lessons Learned

- Successful relay pumping is easier to talk about than perform. Much coordination is needed in order to keep water moving in a multi-pumper relay operation.
- Relief valves on LDH hose appliances are there to protect the hose and should therefore be set at the working pressure limit of the hose.

The Lessons Learned

- Choosing the right discharge connection is important in any pumping operation, but even more so in relay pumping because operators are trying to maximize their flow.
- Use high-flow discharges whenever possible, and if not equipped with a high-flow discharge, combine several smaller lines into a larger one using some type of manifold or valve.

Summary

- The seminar and drill were a success and once again reinforced the need for mutual aid training and interoperability.
- Many thanks to the Franklin County Fireman's Association and the Farmington Fire Department for sponsoring and hosting this seminar.

www.GotBigWater.com

For more information contact us at
thebigcamel@gotbigwater.com