Lakes Region Mutual Fire Aid, New Hampshire

Rural Water Supply Operations Seminar & Drill

Tanker Shuttle Drill
May 17, 2009
Summary Report

Overview

- In May 2009, the Lakes Region Mutual Fire Aid Association (LRMFA) of New Hampshire sponsored a rural water supply operations seminar.
- The seminar, which was delivered by GBW Associates, LLC of Westminster, MD was a joint effort between numerous fire departments in the Lakes Region of central New Hampshire to practice and improve water supply operations.
- This presentation is a summary of the tanker shuttle drill that was part of the seminar.

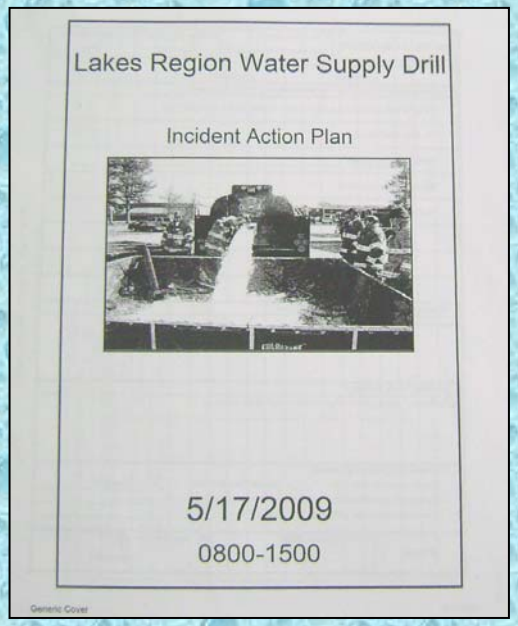
The Purpose

- The purpose of the rural water supply seminar was two-fold. First, the LRMFA folks wanted a “refresher” on rural water supply operations and the opportunity to work together in a training environment.
- Second, the folks wanted an opportunity to run a tanker shuttle operation using portable dump tanks.

The Seminar

- In order to prepare for the tanker shuttle drill, participants attended a 6-hour refresher seminar on May 16th to review the basics of rural water supply operations.
- The seminar was held at the Ashland Elementary School in Ashland, New Hampshire.
- Seminar topics included the history of rural water supply, types of water hauling vehicles, dump site operations, fill-site operations, tanker shuttle operations, and drafting.

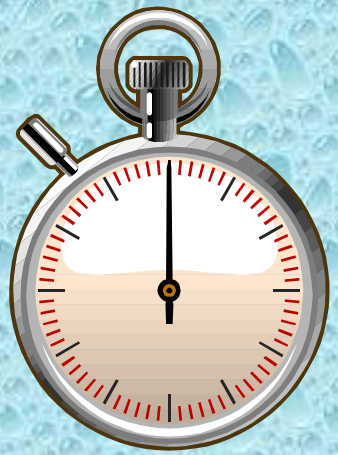
The Drill



- The tanker shuttle drill was held on May 17, 2009, in Ashland FD's first-due area.
- The drill attempted to replicate the 2-hour Water Supply Delivery Test used by ISO in their evaluation of fire department water supply capabilities.
- While in recent times, ISO has come under some scrutiny for its rating schedule, the ISO 2-hour test is still a reasonable standard by which fire departments can compare their water supply operations.

The ISO Test

- There are three critical time segments of the ISO 2-hour Water Supply Delivery Test:
  - 0:00 to 5:00 minutes
  - 5:01 to 15:00 minutes
  - 15:01 to 120:00 minutes



ISO Test: 0:00 to 5:00 Minutes

- A drill location is selected and the units due to respond on the first-alarm assignment are dispatched.
- Time starts when the first engine arrives on the scene and comes to a complete stop.
- There is no requirement to flow water during the first 5 minutes, but the crew must be prepared to flow water once the 5-minute mark is reached.

ISO Test: 5:01 to 15:00 Minutes

- At the 5-minute mark, a flow of at least 250 gpm must be started - and it must be sustained.
- During the next 10-minutes, crews can work to further develop their water supply and increase their flow, however…
- At the 15-minute mark (5+10), whatever amount of water is flowing at that time must be maintained for the remainder of the 2-hour test.

ISO Test: 15:01 to 120:00 Minutes

- Once the 15-minute mark has been reached, the remainder of the 2-hour test is really just about ***sustaining*** the flow.
- The ISO test includes the simulation of mutual aid response and allows additional water supply units to arrive and assist in the delivery process as would happen on a real incident.
- The real advantage of the ISO test is that it gives a fire department the chance to see where improvements can be made in their water supply delivery process.

It is one thing to say that your fire department can deliver 500 gpm for two hours – it is another thing to prove it in a real-life drill scenario!

Lakes Region Drill Participants

The drill participants were from 19 different fire departments and the apparatus that was used was representative of the type of water supply support that would respond to a fire in the Lakes Region.

Drill Participants

- Ashland 2-E-1
  - 1,500 gpm pump w/1,000 gal tank

- Plymouth 18-E-4
  - 1,500 gpm pump w/2,500 gal tank

Drill Participants

- Gilford 8-E-1
  - 2,000 gpm pump w/500 gal tank

- Gilford 8-T-1
  - 1,250 gpm pump w/2,500 gal tank

Drill Participants

- East Andover 32-E-3
  - 1,250 gpm pump w/1,000 gal tank

- Tilton/Northfield 21-T-1
  - 1,500 gpm pump w/2,500 gal tank

Drill Participants

- Strafford 25-E-3
  - 1,750 gpm pump w/3,000 gal tank

- Gilmanton 9-E-3
  - 2,000 gpm pump w/2,500 gal tank

Drill Participants

- Belmont 3-T-1
  - 1,250 gpm pump w/2,500 gal tank

- Stratford Hollow 40-W-1
  - 500 gpm pump w/3,000 gal tank

Drill Participants

- Center Harbor 5-E-2
  - 1,250 gpm pump w/1,000 gal tank

- Holderness 12-E-5
  - 1,500 gpm pump w/2,500 gal tank

Drill Participants

- Campton Thornton 35-E-1
  - 1,500 gpm pump w/2,500 gal tank

- Meredith 14-T-5
  - 1,250 gpm pump w/2,500 gal tank

Drill Participants

- Moultonboro 15-E-4
  - 1,250 gpm pump w/1,000 gal tank

The Target Hazard

Located just outside of downtown Ashland, NH, the Rochester Shoe Tree Factory was chosen as the target hazard for the drill. The facility had been the location of a couple large fires over its history so it provided a realistic site for a large-scale water supply drill.

The Drill Begins

With the crews staged at the elementary school in Ashland, the drill started with the dispatch of the first alarm assignment (2E1,12E5, 5E2, 35E1, and 18E4). Ashland 2E1 is shown above arriving on the scene and laying a 400-ft, 4-inch supply line. The crew quickly advanced a 2-1/2-inch attack line and got ready to flow water at the 5-minute mark.

Help Arrives

Campton Thornton 35E1 and Holderness 12E5 arrive and begin pumping off their water to support the fire attack operations. A clappered LDH siamese is used so that both engine/tankers can be connected at the same time to the attack engine's supply line.

Getting Ready to Flow

As the clock approaches the 5:00-minute mark, crews prepare to begin flowing water from the 2-1/2-inch attack line. Above, the supply crews begin to charge the 4-inch supply line.

Water Flow Starts at 5-minutes

At the 5-minute mark, a 250 gpm water flow is started from the 2-1/2-inch attack line. This flow must be maintained for 10-minutes at which time the flow can be increased.

2-1/2-inch Flow Measurement

An electronic flow meter was used to verify the flow from the 2-1/2-inch attack line. Meanwhile, a Water Supply Task Force is dispatched to assist: it included 9E3, 15E4, and 25E3.

First Dump Tank Arrives

Around the 15-minute mark, the first dump tank arrives on Moultonboro 15-E-4. The 2,100-gallon tank is set-up and the engine begins setting up as the supply engine at the dump site.

Second Dump Tank Arrives

Shortly after the arrival of the first dump tank, a second one arrives on Strafford 25E3. Meanwhile, flow is moved to 500 gpm

2nd Tank Deployed

The dump site crew works to get this 3,500-gallon dump tank set up while engine/tankers continue to pump off their water to the attack engine.

Water Supply Officer

Command assigned DC Shawn Mulcahy (Center Barnstead FD) as the Water Supply Officer for the incident.

Water Runs Out at 19:30 minutes

Unfortunately, at the 19:30 minute mark, water supply to the attack engine ran out and the dump site was not yet ready for drafting operations. However, crews worked feverously to keep building the dump site and water was restored at 20:30 minutes.

Dump Site Operations

As units from the Water Supply Task Force began to arrive, the dump site was set-up. Here, the only strainer available was a small, 2-1/2-inch forestry-style strainer. Fortunately – it was changed out when a bigger strainer arrived.

2nd Water Supply Task Force

At 22:27 minutes, a 2nd Water Supply Task Force was dispatched (32E3, 8E1, 14T5, and 3T1). Above, Meredith 15T5 is shown dumping the first load of water into the dump tank.

More Tankers Arrive

Belmont 3T1 is shown above off-loading its 2,500-gallons of water into one of the dump tanks.

1st Tanker Returns

Holderness 12E5 (2,500 gallons) is the first tanker to return from the fill site and is shown above getting ready to pump to the clappered siamese (rural hitch).

Strainer is Changed Out

With the arrival of other apparatus, a 6-inch low level strainer replaces the 2-1/2-inch strainer and the drafting operation is ready to begin.

500 gpm Flow

A flow of 500 gpm was now in place using a portable monitor supplied by Ashland 2E1.

4-inch Flow Measurement

An electronic flow meter was used to monitor the flow on the 4-inch line that fed the portable monitor.

3rd Water Supply Task Force

At 31:41 hours, a 3rd Water Supply Task Force is dispatched bringing 21T1, 40W1, and 8T1.

3rd Dump Tank

With the arrival of units from the 3rd Water Supply Task Force, another 3,500-gallon dump tank is deployed.

Dump Site Ops Continue

With the dump site now operational at 500 gpm, the ability to quickly off-load tankers becomes an important function.

Dump Site Operations

The three dump tanks are now operational and can accept rear off-loading and side off-loading tankers while jet siphons are used to transfer water between tanks.

Tankers Dump

Gilmanton 9E3 offloads its 2,500 gallons using a rear 10-inch dump. These large dumps can off-load water at a rate in excess of 1,500 gpm.

Oops! A Little Bit of Foam

Somehow, somebody's unit leaked a little bit of Class A foam – making for a rather bubbly operation for awhile.

Flow Moved to 750 gpm

At the 65-minute mark, the flow is moved to 750 gpm while still using the portable monitor fed by a 4-inch supply line.

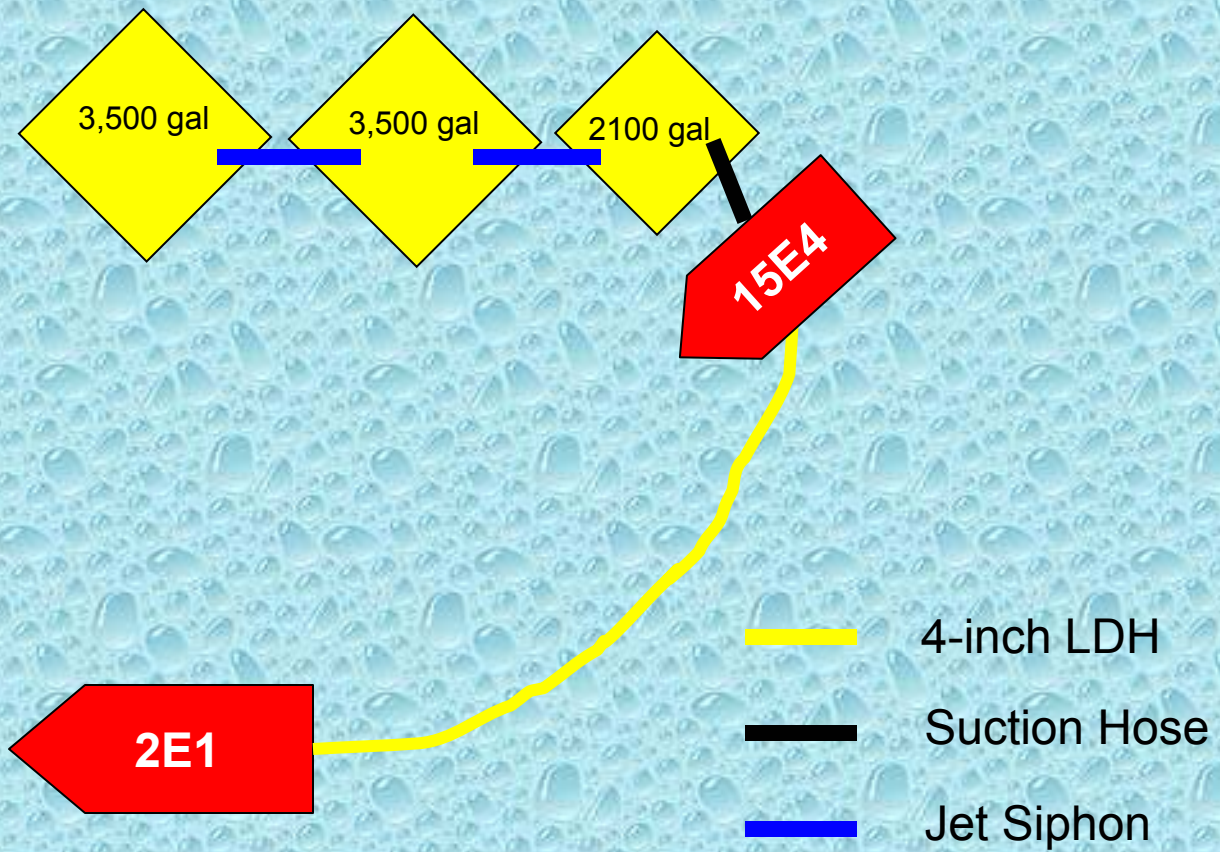
Mechanical Issue Develops

Around the 80-minute mark, Moultonboro's engine developed a mechanical problem and had to be replaced with Plymouth 18E4 –a 1,500 gpm engine/tanker.

Three Dump Tank Operation

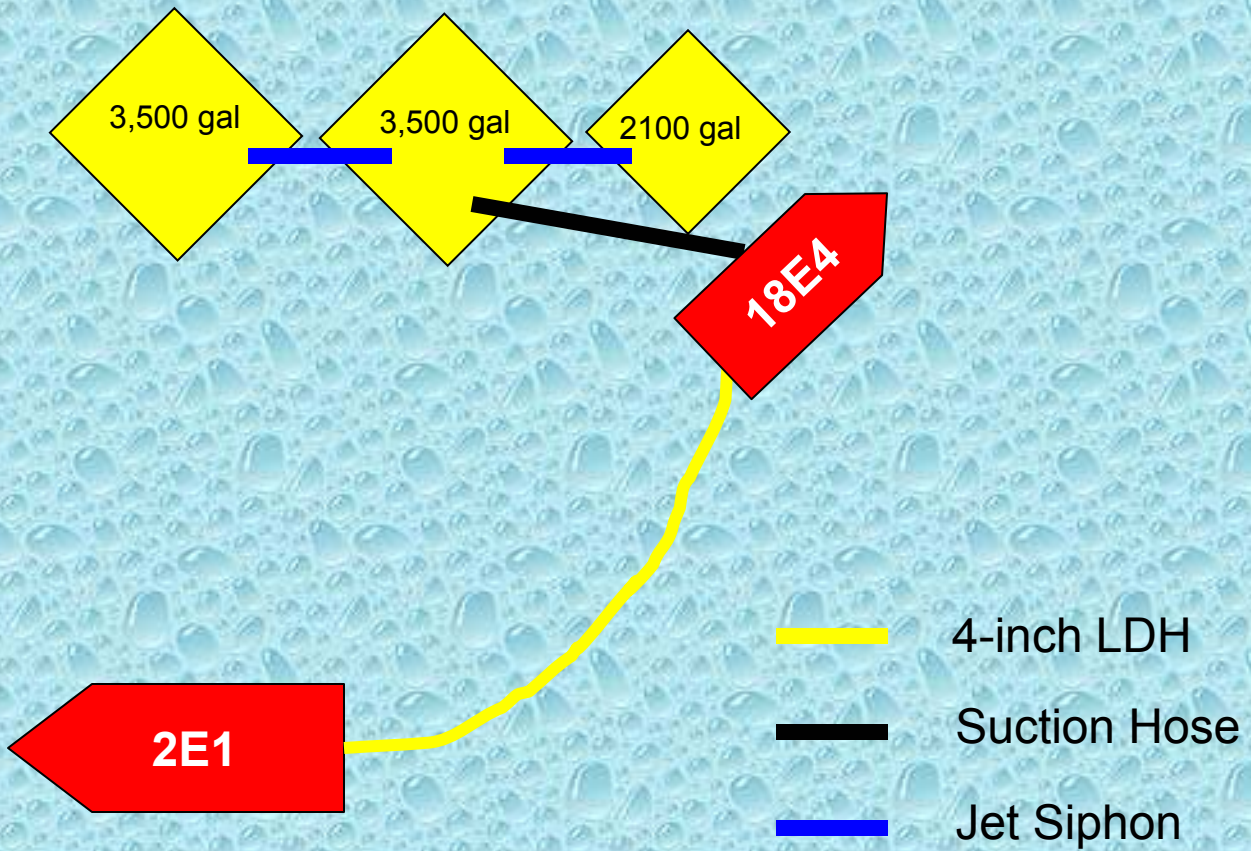
The crews used a three-dump tank set-up to supply the water needed by the attack engine. The tanks were set in a diamond shape and jet siphons were used to transfer water.

Initial Dump Tank Layout



Final Dump Tank Layout

18E4 replaced 15E4



Dump Site Operations

The advantage of side dumps is illustrated above. Strafford 25E3 offloads its 3,000 gallons through one of its 8-inch side dumps.

Another Side Dump

Stratford Hollow 40W1 can really offload its 3,000 gallons when it uses its 12-inch rear dump that can pivot to either side of the rig.

Flow Moves to 1,000 gpm

At the 2-hour mark, the dump tank operation had seemed to stabilize so the flow was moved to 1,000 gpm in order to see if it could be sustained with the units on the drill.

1,000 gpm Sustained for 20-minutes

With everyone hustling, a 1,000 gpm flow was sustained for 20-minutes before the drill was shut down. As is often the case, once the “bugs were worked out” the operation ran pretty effectively.

The Fill Sites

- Three fill sites were used for the drill; a stream, a lake, and a traditional fire hydrant in the Town of Ashland.
- The stream on John Jenness Road was the initial fill site and was supported by Center Harbor 5E2, a 1,250 gpm pumper. This fill site provided a 1.5-mile round trip for rigs hauling water.
- The lake was supported by East Andover 32E3, a 1,250 gpm pumper. This fill site provided a 3.7-mile round trip.
- The traditional fire hydrant was supported by Gilford 8E1, a 2,000 gpm pumper. This fill site provided a 1.6-mile round trip.

John Jenness Road Fill Site

The crew from Center Harbor 5E2 made fast work of getting the first fill site into operation.

John Jenness Road Fill Site

The stream that was used at this fill site had about a 15-ft lift and difficult access. The crews had to be careful in positioning the pumper and used 30-ft of hard suction to reach the water.

John Jenness Road Fill Site

Holderness 12E5 was the first unit to arrive at this fill site and is shown above being filled using 4-inch hose.

John Jenness Road Fill Site

To help improve the operation, a 500 gpm portable pump was put into operation. The crews did a good job of reducing the lift by putting the portable pump as close to the water's edge as possible.

John Jenness Road Fill Site

Without an LDH manifold handy, a traditional gated-wye was adapted to fit the LDH which was then used as the control valve for filling tankers.

Fret Shop Fill Site

The crew of East Andover 32E3 gave their older rig a great workout at this fill site. The 1,250 gpm pumper and its crew drafted from a manmade lake in downtown Ashland and filled tankers using 4-inch hose.

Fret Shop Fill Site

While the lift was not that high, the access was a bit far, so additional lengths of suction hose were needed to reach the water. In addition, the crew used a 500 gpm portable pump to help boost the output of the operation.

Fret Shop Fill Site

Tilton/Northfield 21T1 is shown here being filled by the East Andover pumper.

Route 3 Fire Hydrant Fill Site

This fill site was a hydrant located just off of Route 3 near Interstate 93. The hydrant was on a large main and provided plenty of flow and operating pressure for tanker fill site operations.

Route 3 Fire Hydrant Fill Site

Gilford's 8E1, a 2,000 gpm pumper connected to the hydrant and provided the pumper support for the LDH manifold. Note the additional valves on the hydrant – excellent work for expanding water supply operations if needed.

Route 3 Fire Hydrant Fill Site

By using the LDH manifold system, the tankers could remain on Route 3 and thus have an easy route of travel.

The Results

- The drill ran a full 2-hours and the shuttle operation “stabilized” at 750 gpm near the end of the 2-hour mark.
- Having had to troubleshoot a number of issues during the drill, the crews wanted to try 1,000 gpm as challenge to their set-up.
- So for 20 additional minutes, 1,000 gpm was moved without interruption!

The Results

- ***Unfortunately, water flow was interrupted a few of times during the drill.***
- At 19:30 minutes, water was lost when no tankers were available to pump off water – water was regained at 20:30 minutes.
- At 21:30 minutes – water was lost again but restored at 22:05 minutes.
- At 28:05 minutes – water was lost and then restored at 28:35 minutes.

The Results

- At 34:13 minutes – lost again and restored at 36:39 minutes.
- Finally – water was lost at 80:00 minutes and restored at 84:34 minutes (mechanical issue with pumper)
- Unfortunately – had this been a true ISO evaluation, the operation would have been considered a failure.
- However, because it was a drill – the operation was a success. It was considered a success because <u>everyone</u> learned something.

The Results

- Approximately 57,150 total gallons were moved during the 115 minute event (the first 5:00 minutes no water was moved) resulting in an ***average flow of 470 gpm***.
- However, this rate was really only achieved in the 2nd half of the drill – and it was not continuous.

Lessons Learned

- Ten water hauling rigs, five engines, and a whole bunch of people were used to deliver the 470 gpm in this drill – emphasizing the need to call for help early at a real fire.
- When calling for help, call for it in bundles or clusters. Many jurisdictions have been successful in the use of the Tanker Task Force concept - regardless of differences in local SOPs for fire fighting operations.

Lessons Learned

- When planning water supply operations in non-hydranted areas, it is important to include units that carry portable dump tanks.
- At this drill, no unit on the first alarm assignment carried a dump tank – so there was a significant delay getting storage capacity on the scene.

Lessons Learned

- When setting up multiple dump tanks – take into consideration the layout and the need to accommodate both rear and side offloading tankers.
- Side dumps in addition to rear dumps provide greater flexibility in tanker offloading operations.

Lessons Learned

- Designating a Water Supply Officer early in an incident generally helps make operations go smoother because the Incident Commander is freed up to handle his or her other duties.
- The use of jet siphons improves the transfer of water between dump tanks and dedicating one person to operate the jet siphons generally makes the process function better.

Lessons Learned

- Jet siphons consume pump capacity; consider using a separate pumper to run jet siphons when attempting flows approaching 1000 gpm.
- All size tankers can contribute to the overall delivery rate – some will just be more efficient in the process than others.
- When setting up multiple dump tanks, avoid setting them up in a manner that requires water to be transferred multiple times before it gets to the primary drafting tank. *(See the two layout sketches found earlier in this summary presentation.)*

Lessons Learned

- Small fill lines slow down tanker fill operations. Even if a tanker has a 2-1/2-inch direct fill connection – use an adaptor and connect LDH to that connection.
- Threaded connections slow down fill site operations – consider using cam-lock or Storz-style fittings.
- Adaptors are critical – every tanker should carry multiple adaptors so that they can support all types of fill scenarios.

Summary

- The drill was a success. It showed the value of equipment interoperability and identified a couple of areas where improvement can be made.
- It also showed how to transition from a “Rural Hitch” operation to a dump tank operation.
- Many thanks to the Lakes Region Mutual Fire Aid Association for sponsoring the program and to all of the fire departments who provided support to the seminar.

www.GotBigWater.com

For more information contact us at
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