DeKalb County, Alabama

Rural Water Supply Operations Seminar & Drill

Tanker Shuttle Drill
November 16, 2008
Summary Report

Overview

- In November of 2008, the DeKalb County, Alabama Association of Fire Departments 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 DeKalb County to practice and improve water supply operations.
- This presentation is a summary of the tanker shuttle drill which was part of the seminar.

The Purpose

- The purpose of the rural water supply seminar was two-fold. First, the folks in DeKalb County 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 improve their ability to run a tanker shuttle and operate a dump site.

The Seminar

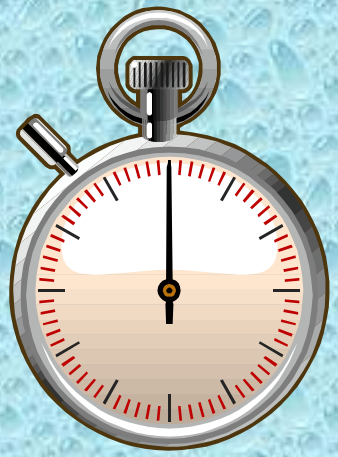
- In order to prepare for the tanker shuttle drill, participants attended a 6-hour refresher seminar on November 15th to review the basics of rural water supply operations.
- The seminar was conducted at the Plainview High School located in Rainsville, Alabama.
- Seminar topics included the history of rural water supply, tanker construction, dump site operations, fill-site operations, tanker shuttle operations, and drafting.

The Drill

- The tanker shuttle drill was held on November 16, 2008, in Sylvania 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!

DeKalb County Drill Participants

The participants for the drill were from 18 different fire departments and the apparatus was representative of the type of water supply support that would respond to a fire in DeKalb County.

Drill Participants

- Fyffe Engine 2
  - 2000 gpm pump w/750 gal tank

- Fyffe Engine 4
  - 1250 gpm pump w/1800 gal tank

Drill Participants

- Aroney Engine 3
  - 1250 gpm pump w/3000 gal tank

- Henagar Engine 4
  - 1500 gpm pump w/1000 gal tank

Drill Participants

- Henagar Tanker 2
  - 2000 gal tank w/400 gpm PTO pump

- Dogtown Engine 1
  - 1250 gpm pump w/ 1000 gal tank

Drill Participants

- Dogtown Tanker 1
  - 1400 gal tank

- Pine Ridge Engine 1
  - 1250 gpm pump w/1000 gal tank

Drill Participants

- Sylvania Engine 2
  - 1250 gpm pump w/1000 gal tank

- Sylvania Tanker 1
  - 3000 gal tank w/500 gpm PTO pump

Drill Participants

- Sylvania Tanker 2
  - 3750 gal tank w/50 gpm PTO pump

- Hammondville Truck 1
  - 1500 gal tank w/250 gpm pump

Drill Participants

- Adamsburg Tanker 1
  - 2500 gal tank w/ 1250 gpm pump

- Southern Fire Demo Tanker
  - 2000 gal tank w/1250 gpm pump

Drill Participants

- Kilpatrick Engine 2
  - 1250 gpm pump w/1000 gal tank

The Drill Begins

Pine Ridge Engine 1 arrives on scene with a 4-person crew and the clock starts when the air brakes are set.

Attack Line Deployment

Engine 1's crew deploys a portable monitor fed by 100-ft of 2-1/2-inch hose which will allow a 250 gpm flow to be started at the 5-minute mark.

Flow Measurement

A fixed-pitot tube and gauge are mounted to the portable monitor so that flow can be measured during the drill.

1st Tanker Arrives

A decision is made to use a nurse tanker while dump tanks are set-up. Sylvania Tanker 2, a 3,750 gal tanker arrives and prepares to supply Pine Ridge Engine 1. LT Eric Burnham (right) assumes the role of Water Supply Group Supervisor.

Nurse Operations

The crews prepare for nurse operations.

Water Flow Begins at 250 gpm

At the 5:00 minute mark, Engine 1 begins flowing 250 gpm using the portable monitor.

With nurse tanker operations underway, a problem is encountered; this tanker can barely keep up with the flow rate of the Pine Ridge engine. The cause of the problem is that the tanker is a “used” water tanker for street watering and its small off-loading pump cannot support the drill’s 250 gpm flow.

Dump Site Set-up

With water now flowing, Kilpatrick Engine 2 arrives and the first dump tank (3,000-gallon) is set-up.

Getting Ready to Transition

Additional crews arrive and dual, 3-inch lines are laid in order to supply Pine Ridge Engine 1 - thus switching from a nurse tanker operation to a dump site operation.

Dump Site Expansion

Dogtown Tanker 1 (1,400 gallon) arrives and off-loads into a second dump tank (3,000 gallon) as the dump site begins to expand.

Water Transfer

Crews work to install the first jet siphon so that water can be transferred from the 2nd dump tank into the 1st dump tank.

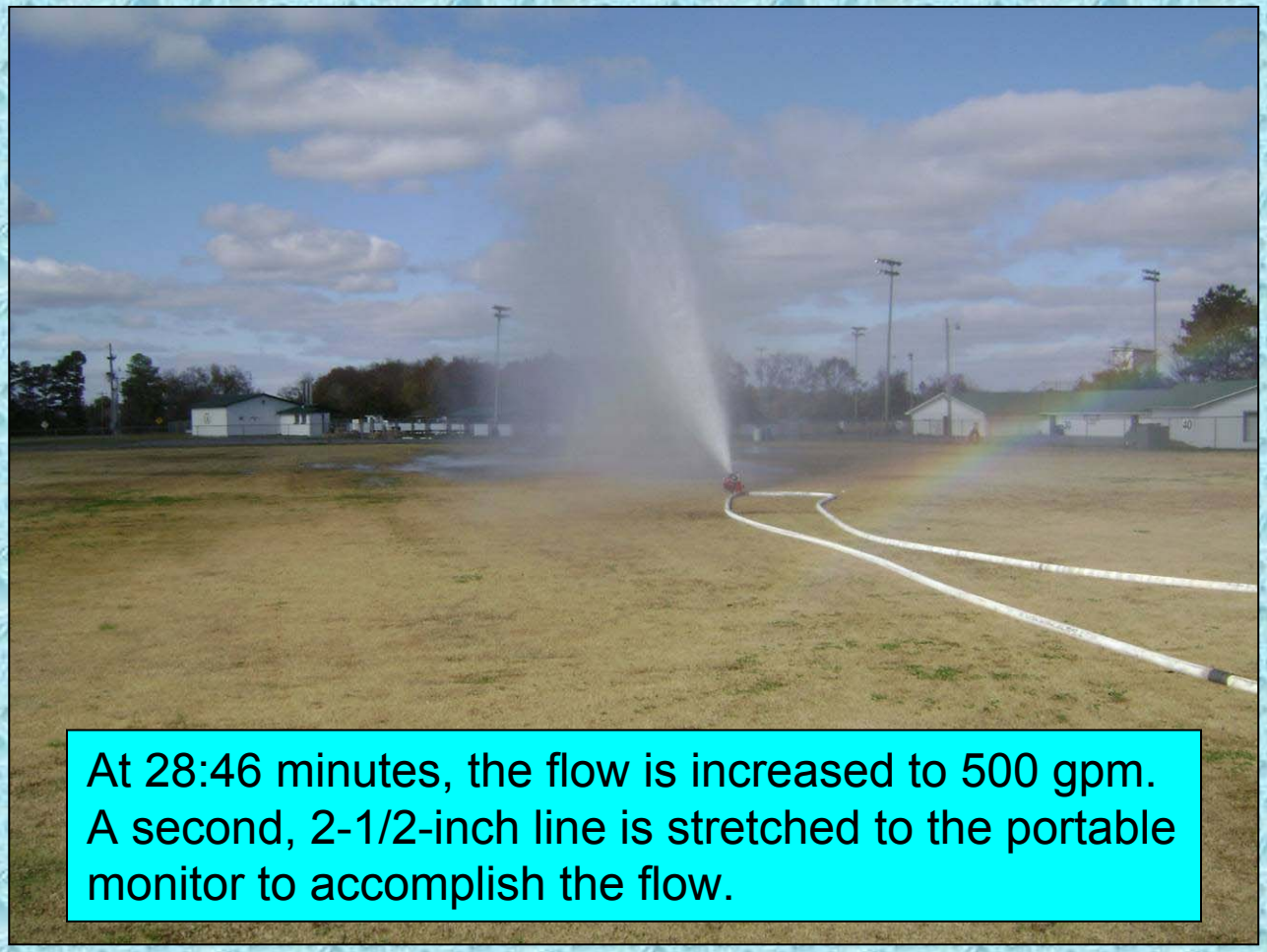
More Tankers Arrive

Dogtown Engine 1 uses its Jet Dump to quickly off-load 1,000 gallons of water into the initial dump tank.

Dump Site Operations

With more tankers soon to arrive, the dump site begins preparations to receive their water. At 19:50 minutes, two dump tanks are “up and running”.

Flow Is Increased



At 28:46 minutes, the flow is increased to 500 gpm. A second, 2-1/2-inch line is stretched to the portable monitor to accomplish the flow.

Jet Siphon Control

This fire fighter is controlling two jet siphons using the gated-wye attached to the pumper discharge. One of the jet siphons is used to help the Kilpatrick engine maintain its draft.

Nurse Tanker Dumps

Sylvania Tanker 2 switches from the nurse mode to the dump and run mode of operation now that the dump site is operational.

Water Transfer Operations

With two dump tanks now operational, jet siphons play a key role in transferring water.

3rd Dump Tank

Busy Times at the Attack Engine

- Pine Ridge Engine 1's pump operator is kept busy taking in three supply lines (two from dump site and one from nurse tanker) and pumping two lines to the portable monitor.

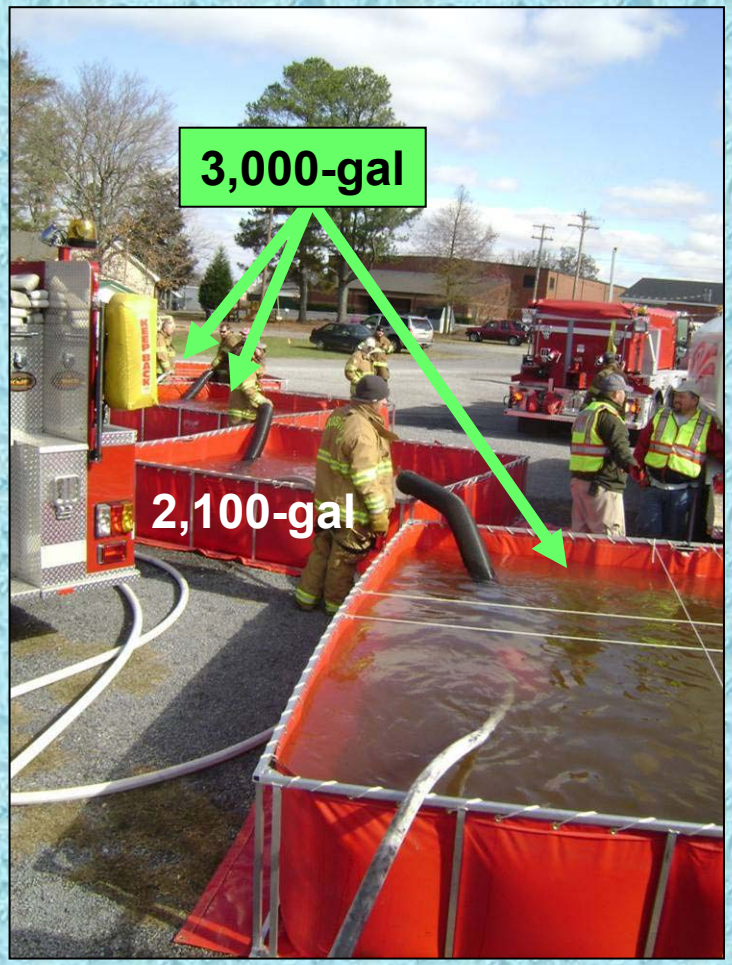
Nurse Tanker Switch

Aroney's 3,000 gallon tanker replaces the Sylvania tanker in the nurse operation and the flow to the attack pumper becomes consistent.

Nursing a Nurse Tanker

The 2,000 gallon Southern Fire demo tanker arrives and nurses the nurse tanker – probably not a good use of two large tankers, but it supported the flow until other rigs arrived. It would have been better to have the demo tanker dumping and running.

4th Dump Tank



- A 4th dump tank (3,000) is set-up and the dump site becomes fully-operational.

More Tankers Arrive

Adamsburg's tanker off-loads its water.

More Jet Siphons

Four jet siphons are put into operation and the jet siphon operator is now a busy guy!

Flow is Increased Again

At 38:00 minutes, a 2nd portable master stream is put into operation so that more water could be moved.

Dual Jet Siphons

Dual jet siphons are now needed to support the flow into the primary drafting tank.

Dumping and Running

Multiple tankers are now dumping and running and keeping the shuttle operational.

The Fill Sites

- Two fill sites were used for the drill; a lake and a traditional fire hydrant.
- The lake was the closest fill site and was supported by Sylvania Engine 2, a 1,250 gpm pumper. This fill site provided a 3.0-mile round trip for rigs hauling water.
- The traditional fire hydrant was supported by a Fyffe Engine 2, also a 1,250 gpm pumper. This fill site provided a 5.0-mile round trip.

DeKalb County Public Lake

Sylvania Engine 2 sets up on the boat ramp and prepares to draft. The 5-inch hose line (lower) is set to supply a LDH appliance for filling tankers.

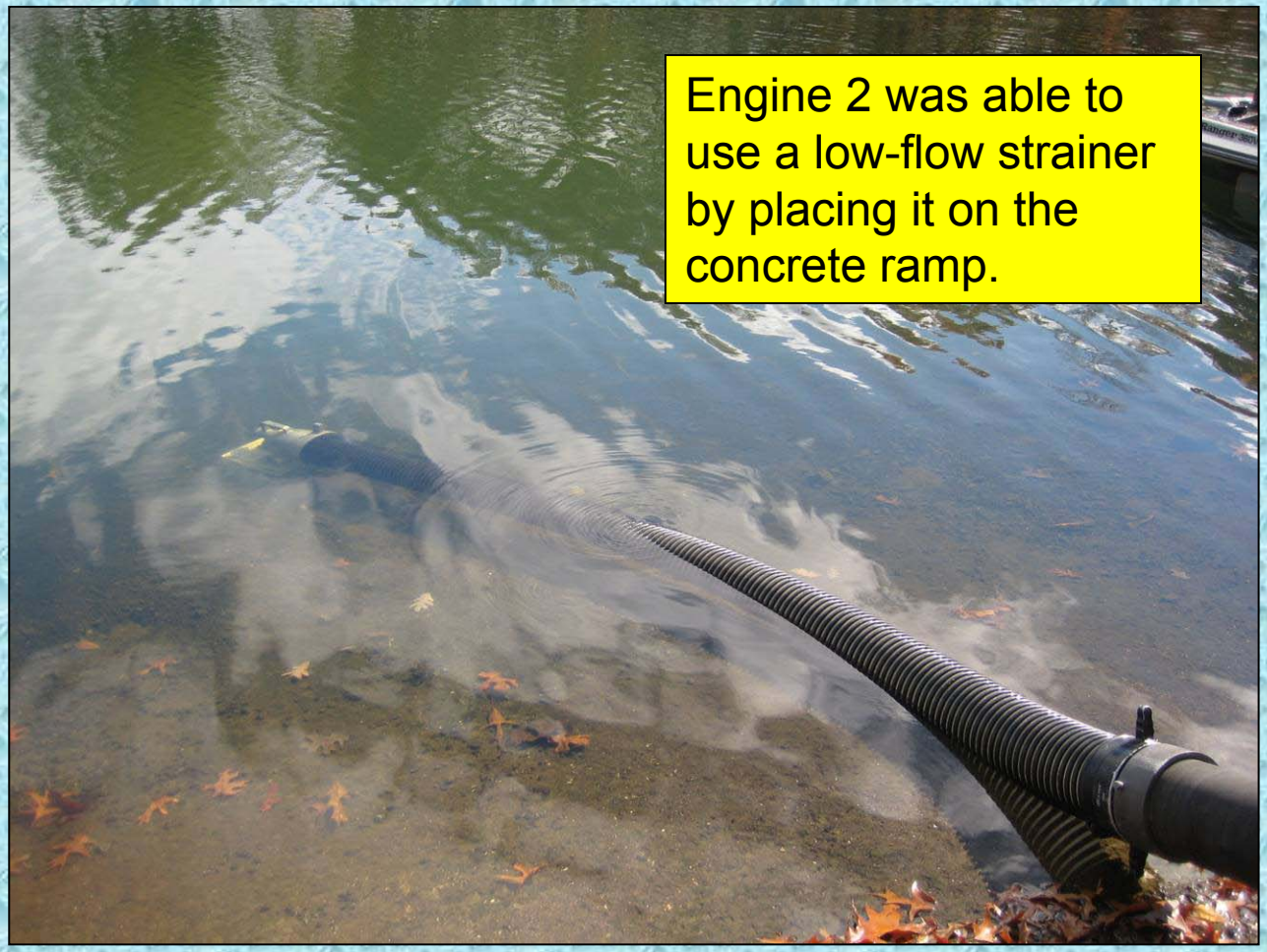
Lake Fill Site

Engine 2 elects to use their front suction for drafting which ends up reducing their ability to meet the 1000 gpm filling requirement.

Front Suction for Drafting

It is important to remember that a front suction on a rig with a midship mounted fire pump is NOT rated for the capacity of the pump and use of the front suction generally reduces the pump's capacity at draft.

Strainer Use



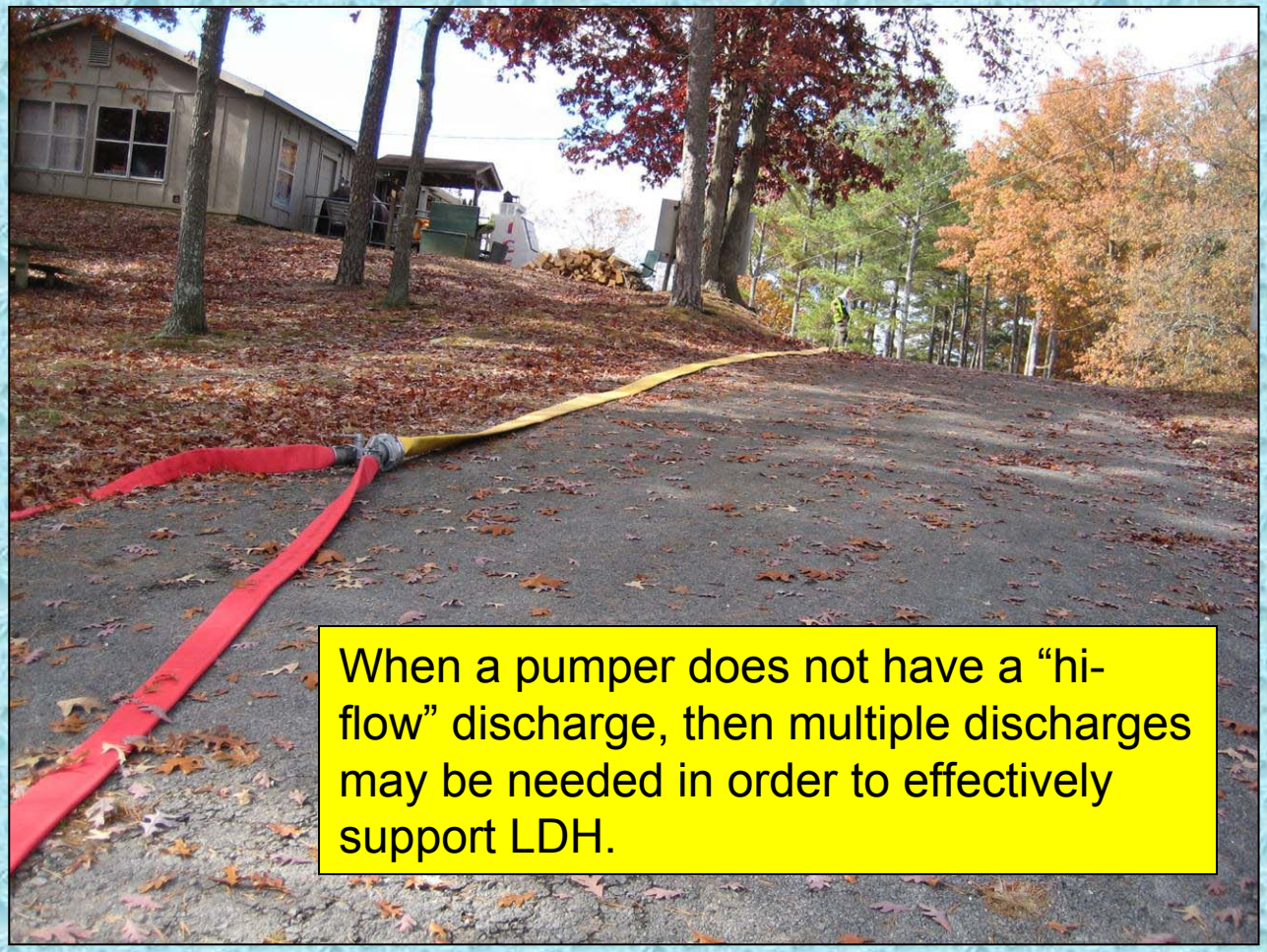
Problems Flowing

Another flow problem was encountered – Engine 2 elected to connect the 5-inch hose to a 2-1/2-inch rear-discharge. While this certainly works, the problem here is that the flow was limited to about 600 gpm - when 1000 gpm was needed.

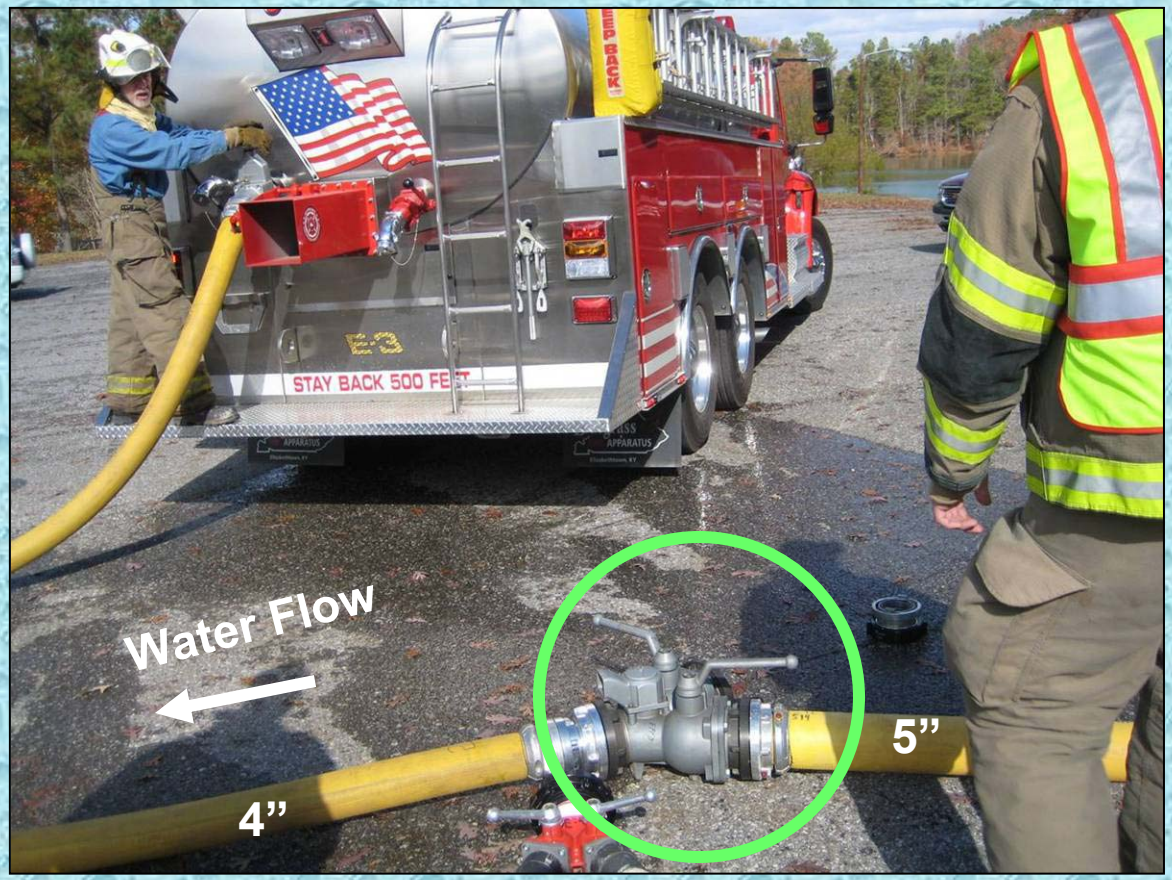
Fixing the Problem

To fix the problem, two, 3-inch lines were pumped (each from a different 2-1/2-inch discharge) into the 5-inch hose. This helped but did not overcome the front suction drafting problem.

Fixing the Problem



Using LDH Appliances



Note the wye is “reversed”. This allows one outlet to serve as a large drain.

A 5-inch “Jumbo” wye is used to fill Aroney’s 3,000 gallon tanker (using 4-inch hose).

Small, Direct Fill Lines Hamper Fill Operations

Almost all of the tankers attending this drill had small, direct fill lines which hampered their ability to load. The fill site crews used “cam lock” adaptors and LDH where possible – but large, direct fills would have made a big difference.

Fill Site Staging

The parking lot at the lake had plenty of space for tankers to stage while waiting to be filled. Tankers using this fill site had to make a 3-mile round trip.

Small, Direct Fill Lines

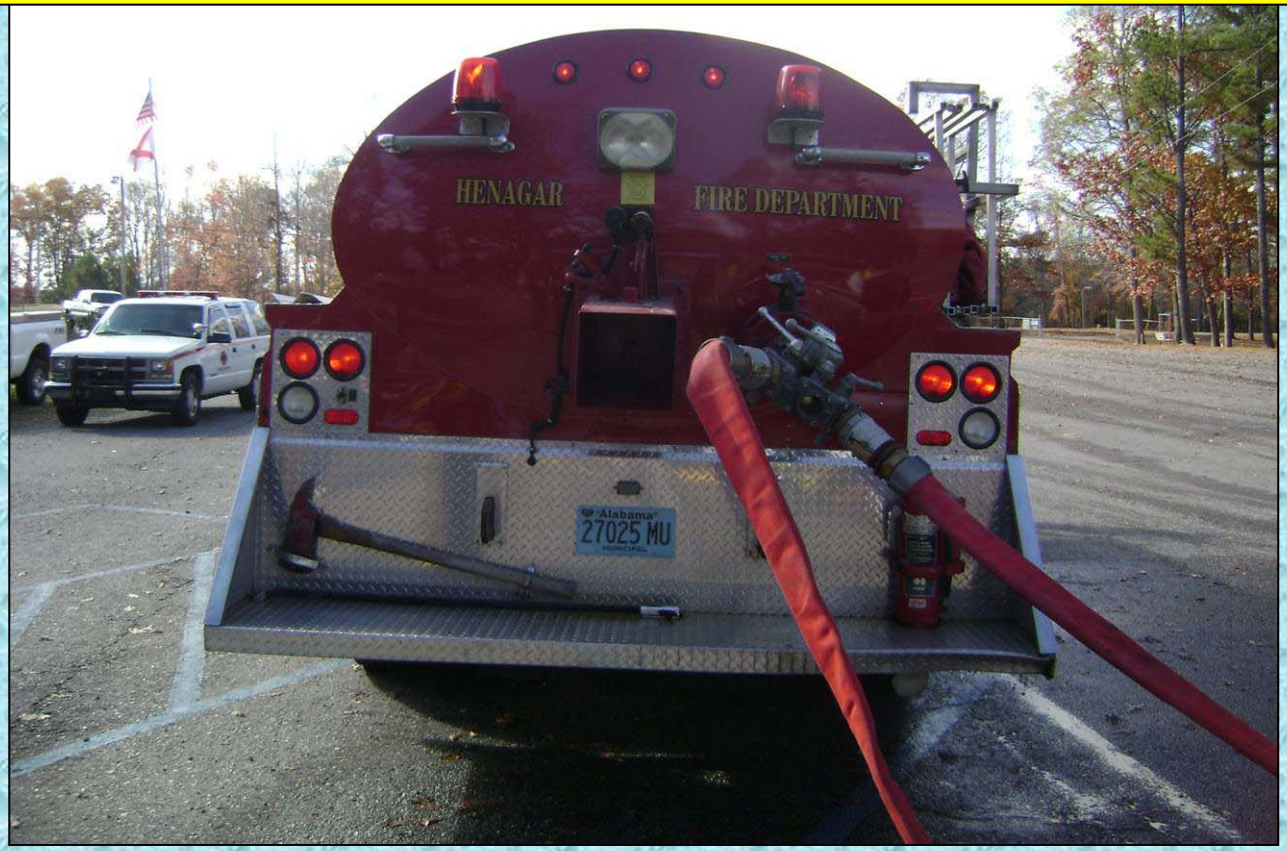
This smaller tanker has a large dump that dumps quick – filling could be faster if a larger, direct fill existed or LDH was used.

Over the Top Filling

This converted fuel tanker has a homemade over-the-top fill pipe.

Being Creative

Two, 3-inch lines outfitted with cam locks are used to fill Henegar's tanker.



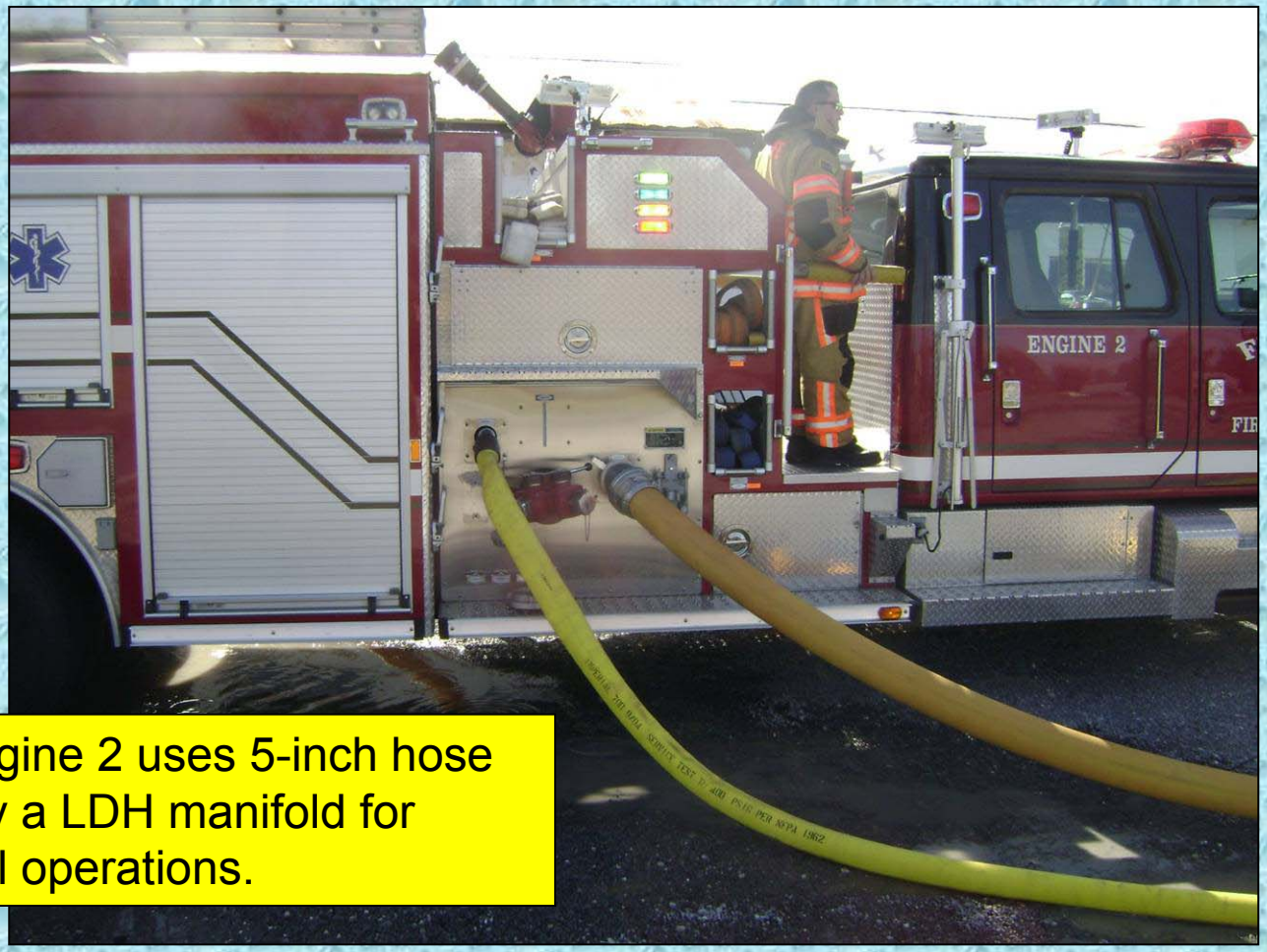
Buttrams Crossroads Fill Site

Fyffe Engine 2 (1,250 gpm) uses a municipal fire hydrant to provide water supply at its fill site. Tankers using this fill site had to make a 5-mile round trip from the dump site.

Hydrant Hook-up

The Fyffe crew used a “heavy water” hook-up allowing an additional supply line to be taken off of the hydrant (if needed) without having to shut down the hydrant.

Fill Site Engine



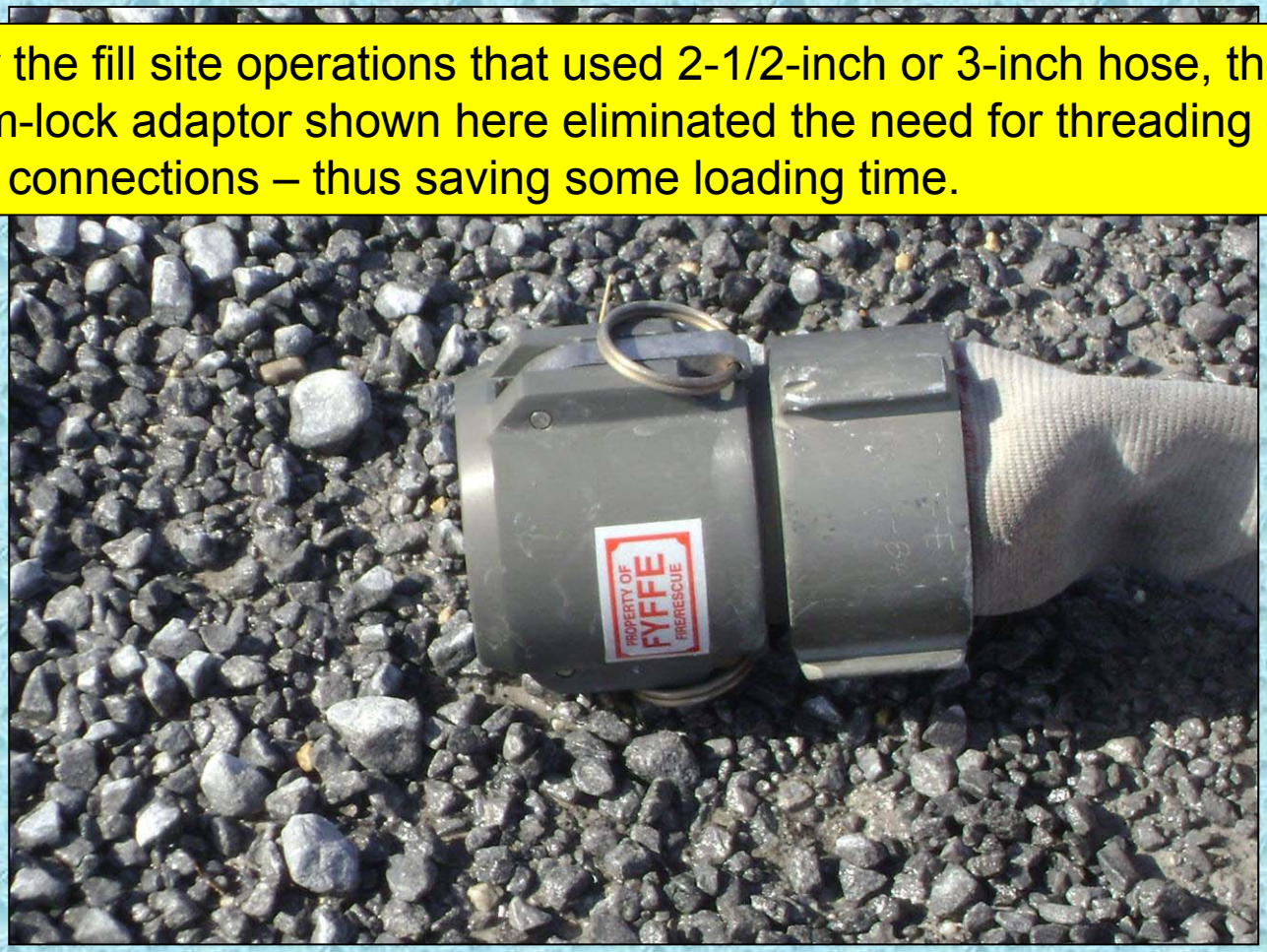
Fyffe Engine 2 uses 5-inch hose to supply a LDH manifold for tanker fill operations.

LDH Used to Fill

This tanker has a 4-inch direct fill but there are no adaptors or 4-inch hose at this fill site – so the large direct fill can only be supported with small hose.

Cam Lock Fittings

For the fill site operations that used 2-1/2-inch or 3-inch hose, the cam-lock adaptor shown here eliminated the need for threading on the connections – thus saving some loading time.



Adaptors Prove Troublesome

A common issue at both fill sites was the need for adaptors. Hose fittings that were used included 2-1/2-inch NST, 2-1/2-inch cam locks, 3-inch cam locks, 4-inch Storz, and 5-inch Storz.

Cam Locks Reduce Time

A 3-inch cam lock fitting in operation filling an engine tanker.

The Results

- The drill was stopped after 93-minutes when the shuttle operation “stabilized”. It was stopped because the crews wanted to have time to conduct some tanker fill testing.
- ***Water flow was never interrupted at the attack engine***, however, the 250 gpm flow fluctuated for the first 15 minutes or so – primarily due to the nurse tanker problem.
- Once the nurse tanker issue was corrected, the flow was increased and eventually reached the point of using two, portable master stream devices.
- A total of 61,020 gallons were moved during the 88-minute event (first 5-minutes no water was moved) resulting in an ***average flow of 693 gpm***. However, this rate was really only achieved in the 2nd half of the drill.

Lessons Learned

- Nine water transport rigs and three pumpers were used to deliver the 693 gpm for the duration of this drill – emphasizing the need to call for help early in an incident.
- When setting up a dump site using a nurse tanker, it is important that the nurse tanker be able to support the flow established by the attack pumper. At this drill, the first tanker to arrive could not pump off its water fast enough to keep up with the 250 gpm flow established by the attack engine – thus supporting the value of having a regular, centrifugal fire pump on a tanker.
- When setting up multiple dump tanks – take into consideration the layout and the need to accommodate rear offloading tankers.

Lessons Learned

- Side dumps in addition to rear dumps provide greater flexibility in tanker offloading operations.
- Designating a Dump Site Leader (officer) to direct dump site operations helps make things go smoother.
- The use of jet siphons improves the transfer of water between dump tanks and dedicating one person to operate the jet siphons makes matters even 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.

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 areas of weakness where improvement can be made.
- All of the crews worked very well together and all of the apparatus proved capable of dumping water – filling however needed some improvement. If every tanker could have filled faster then more trips could have been made and thus – a higher average flow could have been achieved.
- Many thanks to the DeKalb County Association of Fire Departments for sponsoring the program and to all of the fire departments and vendors who provided support to the seminar.

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