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# Pine Mountain Volunteer Fire & EMS District
# Remlap, Alabama

## Rural Water Supply Operations Seminar
## 2-hr Water Supply Drill – October 3, 2010
## Summary Report

# The Purpose

- The purpose of the seminar and drill was to review the basics of rural water supply operations and to practice water supply operations in a non-hydranted setting.
- The drill also allowed mutual aid companies to work together in a real-life training situation.

# The Seminar

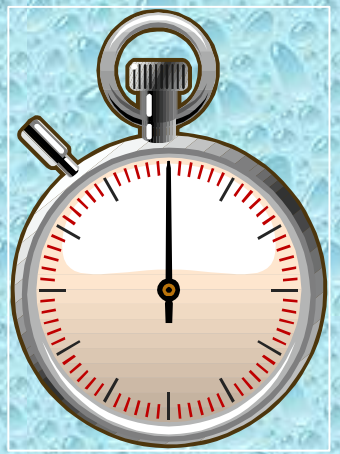

- The seminar started with a 6-hour session to review the basics of rural water supply operations.
- The review session was held at the Frank Green Building located in Oneonta, Alabama.
- Seminar topics included the history of rural water supply, tanker construction, dump site operations, fill-site operations, tanker shuttle operations, and drafting.
- Seminar participants were from Blount County and the surrounding area.

# The 2-hour Water Supply Drill

- The tanker shuttle drill was held on October 3, 2010, at Inland Lake near Allgood, Alabama .
- 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 everyone in the fire service may not agree on ISO's evaluation of fire department capabilities, the ISO 2-hour test is still a reasonable standard by which fire departments can compare their water supply operations.


# The ISO Test

- The ISO 2-hour Water Supply Delivery Test has three critical time segments:
  - 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 automatic 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!

# Water Supply Drill Participants

- *The participants for the drill were from eleven different fire departments in three counties and the water hauling apparatus was representative of the type of water supply support that would respond to a structure fire in the Pine Mountain/Remlap Area.*

# Drill Participants

- Pine Mountain Engine 1451
  - 1,500 gpm pump w/1000 gal tank
- Pine Mountain Tanker 1462
  - 250 gpm pump, w/1,800 gal tank

# Drill Participants

- Remlap Engine 8052
  - 1,250 gpm pump w/500 gal tank


- Remlap Tanker 8064
  - 1,500 gal tank

# Drill Participants

- Remlap Tanker 8065
  - 1,500 gal tank


- Holly Springs Tanker 9262
  - 250 gpm pump, w/1,800 gal tank

# Drill Participants

- Wolf Creek Engine 2352
  - 1,250 gpm pump w/1,000 gal tank


- Cleveland Tanker 561
  - 50 gpm pump, w/2,500 gal tank

# Drill Participants

- Locust Fork Tanker 761
  - 1,250 gpm pump w/3,000 gal tank
- Dallas/Selfville Engine 852
  - 1,250 gpm pump, w/500 gal tank


# Drill Participants

- Dallas/Selfville Tanker 861
  - 500 gpm pump w/3,300 gal tank
- Firovac Vacuum Tanker
  - 500 gpm pump, w/3000 gal tank

# Preparation


Units began the day at the Frank Green Building in Oneonta where an operational briefing was conducted outlining the objectives for the drill. Safety issues were also reviewed. Units then relocated to a position on Boat Landing Road and awaited dispatch.

# The Drill Begins

With everyone ready, the drill started. Pine Mountain Engine 1451 arrives on the scene and the clock starts. The 4-person crew works to advance a 4” line to a TFT Blitzfire while also beginning to set up for dump tank operations.

# The Drill Begins

With the Blitzfire in place, all efforts are directed at setting up for dump site operations.

# 1st Tanker Arrives

Pine Mountain Tanker 1462 is the first tanker to arrive and crews quickly grab equipment off it to support dump site operations.

# Dump Site Set-up

The two crews made great progress in getting the first dump tank set up. The first tank down was a 2,100-gallon tank from the Pine Mountain tanker.

# 2nd Tanker Arrives


Remlap Tanker 8064 was the second tanker to arrive on the scene providing ample water to support the fire flow for the initial 10 minutes of operation.

# Water Flow Starts at 5:00 Minutes

At the 5:00-minute mark, water flow was started at 250 gpm. A flow test device with a fixed pitot tube was used on the Blitzfire to ensure accurate flow measurement.

# 2nd Tank is Set Up


Around the 6:30-minute mark, the first dump tank was loaded with water and a second tank was set up.

# Dump Site Set-up

The dump site crews began setting up water transfer operations as the second phase of the ISO test got under way. The crews had ten minutes to expand the flow rate.

# Dump Site Set-Up



With the second dump tank down (1,500 gallons), Remlap's tanker offloaded its water – although, it looked more like decaf coffee than water!!!

# A Problem Arises


As with a real incident, a mechanical problem arose with the dump site engine and a draft could not be attained. With the on-board water supply dwindling, flow to the Blitzfire was interrupted at the 10:52-minute point.

# A Problem Arises


With flow now interrupted, troubleshooting operations commenced. The first option was to try and self-prime using the jet siphon connection on the low level strainer. Unfortunately, that did not work. The pump would not pump.

# 3rd Tank is Set-up

Meanwhile, a third dump tank is set up as the dump site expands. The 3,000-gallon Firovac vacuum also arrived as did the 3,300-gallon tanker from Dallas-Selfville.

# Swapping Out Pumpers

With the Pine Mountain pumper our of commission, the decision was made to replace it with Wolf Creek's 1,250 gpm pumper.

# Nurse Tanker Operations


Meanwhile, Tanker 861 from Dallas-Selfville set up to operate as a nurse tanker while problems were worked out with the dump site pumper.

# Swapping Out Pumpers

Fortunately, there we only a couple of hose connections that needed broken and reconnected and the folks worked quickly to make those changes.

# Back In Operation


In just under 14-minutes, the dump site crew had swapped out the two pumpers and water began flowing to the Blitzfire once again.

# 4th Tank Set Up

A 4th dump tank (1,500-gallons) was set up shortly after the water flow was resumed.

# More Tankers Arrive


Cleveland's Tanker 561 dumped its 2,500 gallons into the 4th tank as the crews prepared to increase the flow.

# Flow Moves to 500 gpm

At the 45-minute mark, the flow was moved to 500 gpm where it was basically sustained for the remainder of the drill.

# Dump Site Operations


No longer needed as a nurse tanker, Tanker 861 repositioned to dump its water.

# Water Transfer Operations

With multiple dump tanks now full of water, the process moved to transferring water between the tanks. Jet siphons were used to support the water transfer operation,.

# Dump Site Operations



With dump site operations stabilizing, additional tankers began to arrive. Holly Springs Tanker 9262 is shown above dumping its water.

# Dump Site Operations


The drill had a good mix of small and large tankers running in the shuttle.

# Dump Site Operations

Water transfer operations became a bit of a challenge because jet siphons were in short supply initially.

# Dump Site Operations

One of the difficulties encountered was that the dump site pumper was at the "end of the line" of tanks – which meant water had to be transferred more often than if the pumper had drafted out of a center tank.

# Water Transfer Operations

A common question asked about jet siphons is, “What pressure do you pump to the jet siphon?” The answer is simple, pump enough pressure to make the flow coming out of the jet siphon look like the one in the photo above.

# Dump Site Operations


There were a couple of moments when tank levels got dangerously low. Look at the level of the yellow tank – good thing Cleveland's tanker just showed up!

# Dump Site Operations


Remlap's 1,500-gallon tanker proved to be a pretty versatile tanker.

# Dump Site Operations

The Firovac tanker ended up hauling several loads of water making it a big contributor to the overall operation.

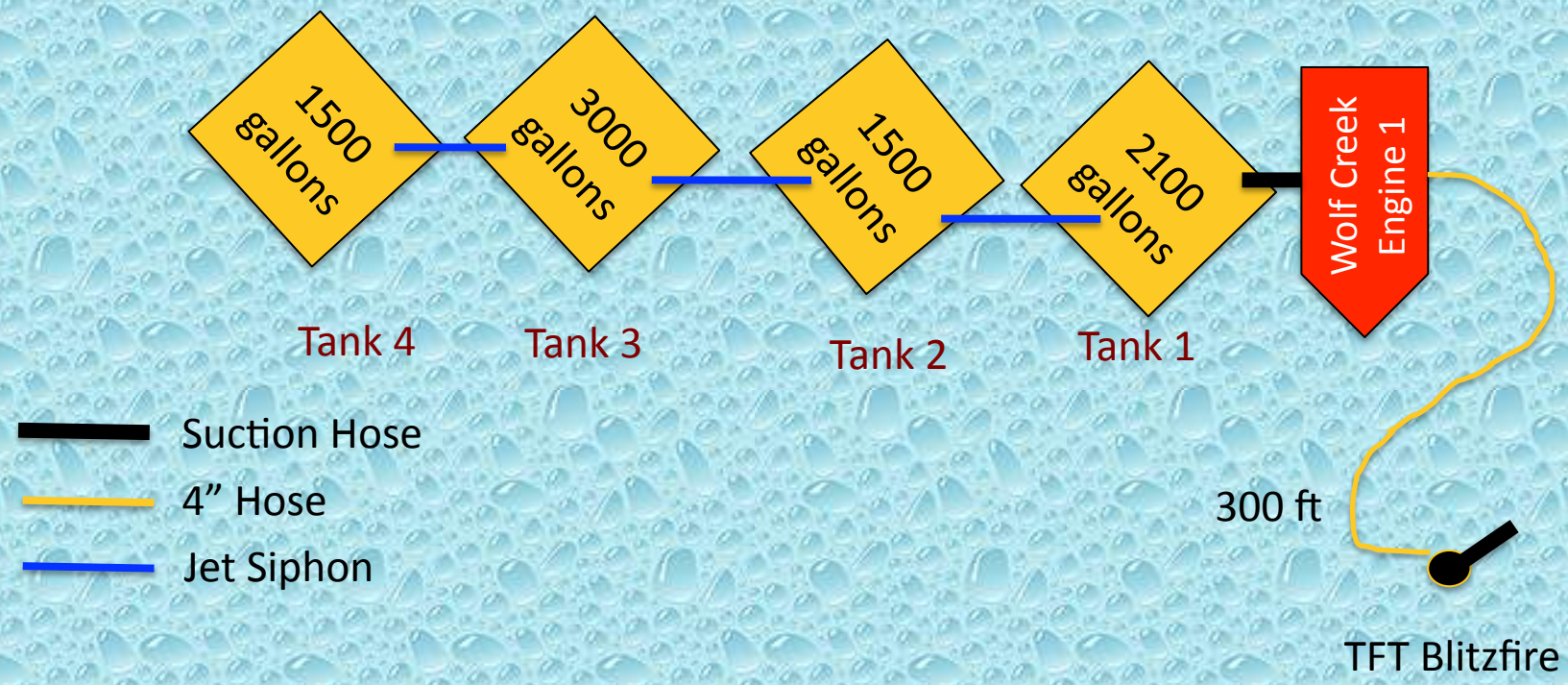
# Dump Site Operations

The Dallas-Selfville tanker also was a large contributor to the overall operation.

# Vacuum Tanker


The vacuum tanker uses a large rotary gear pump to develop vacuum for loading and pressure for offloading. The tanker is shown above “blowing off” its water at around 1,800 gpm.

# Dump Site Layout



# The Fill Sites

- For this drill – two fill sites were used – one at Inland Lake and one at a hydrant on Boat Landing Road.
- The lake fill site required a pumper to draft from the boat ramp and generated a 5.7-mile roundtrip for tankers hauling water.
- The hydrant fill site was never really used much due to a communications error. However, when used, it provided a 4.0-mile roundtrip for the tankers hauling water.

# Lake Fill Site


Remlap Engine 8052 (1,250 gpm) arrives at the boat ramp to set up a tanker fill site. They laid out 300-feet of 4-inch hose and dropped an LDH manifold for fill site operations.

# Lake Fill Site


The engine crew did a great job of getting their rig set-up for drafting. By getting their pumper close to the water source, they minimized the lift and maximized pump capacity.

# Lake Fill Site

A floating strainer was used due to shallow water near the ramp. The ladder was used to help keep the strainer in place. Note the use of a circulation line – again, good drafting practices.

# Lake Fill Site


Not pretty – but functional. Two manifolds were connected together at the tanker loading station. This allowed the tankers to be filled using 4-inch hose while still having a 2-1/2" outlet for a drain.

# Lake Fill Site

Pine Mountain Tanker 1462 (1800 gallons) was one of the first tankers to get filled at the lake fill site. It was filled in just over 2:00 minutes – or about an 800 gpm fill rate.

# Lake Fill Site


The fill-site crew also did a great job of managing fill site operations. Here they are shown filling the Holly Springs tanker while one of Remlap's tankers is in line to be filled next.

# Lake Fill Site


Both of Remlap's tankers were quite the performers at the drill. They filled quick and dumped quicker. The key of course was filling with 4" hose.

# Vacuum Tanker Fill Operations

The Firovac vacuum tanker operated independently of all fill sites. The two-person crew was able to fill the 3,000-gallon tanker by simply getting next to the water's edge and engaging the vacuum pump.

# Vacuum Tanker Fill Operations

Once the vacuum tanker crew set up their suction hose and strainer the first time, they could just leave it in place and take off hauling water. Upon their return to the fill site, all the crew had to do was connect the suction hose back up to the rig. This is perhaps the greatest feature of the vacuum tanker – no need for a fill site engine or crew!

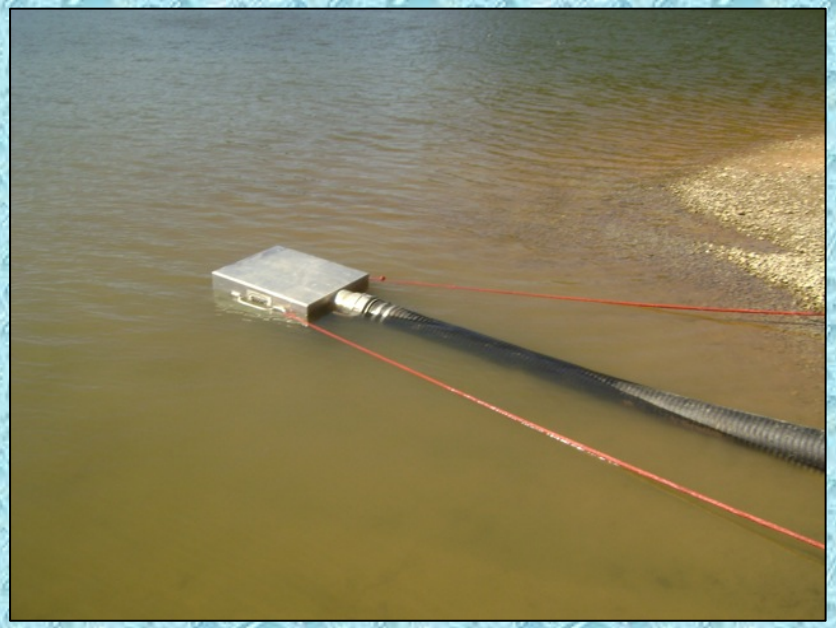
# Vacuum Tanker Fill Operations

The vacuum is shown here arriving at the fill site and getting ready to connect up to the suction hose.

# Vacuum Tanker Fill Operations

With the vacuum pump engaged and already drawing a vacuum on the tank, the crew connected the 6-inch suction hose to the suction inlet.

# Vacuum Tanker Fill Operations



The valve was then opened and water began to enter the tank. The specially designed high-flow strainer allowed the tanker to be loaded at a rate over 1,000 gpm.

# Hydrant Fill Site

The hydrant fill site was only used once. Pine Mountain's tanker crew is shown here using 4-inch hose to fill directly off of the hydrant.

# Hydrant Fill Site

A 4-inch Storz to CamLock fitting was used at the hydrant fill site on the fill line.

# The Results

- The drill was stopped after two hours and two minutes.
- Water flow was interrupted twice - once at the 10:52-minute mark when a problem occurred with the dump site pumper; and again at the 62:35-minute mark when dump tank levels were low.
- An estimated 44,817 gallons of water were flowed through the attack engine during the drill - producing an average flow rate of 434 gpm.

# The Lessons Learned

- There was over 18,000 gallons of "water on wheels" at this drill – so sufficient water was available to sustain the 500 gpm for some time. This shows the importance of "front-loading" assignments so that adequate water is enroute to incident "on the go down."
- It is not easy to transition from using one's booster tank to drafting from a dump tank without interrupting water flow. This was the case at this drill as well. Plus, the dump site pumper developed a mechanical problem that forced it to be replaced.

# The Lessons Learned

- While the 14-minute interruption would have proven bad for ISO, it was a good exercise in preparedness as crews worked quickly to swap out pumpers so that water flow could resume.
- When moving to a multiple-dump tank operation, additional appliances are going to be needed. At this drill, the dump site was short a jet siphon for awhile which limited their ability to transfer water from the 4$^{th}$ tank..

# The Lessons Learned

- The use of multiple jet siphons also consume pump capacity and discharges. When expanding beyond a 3-dump tank operation, crews should consider using an additional pump (pumper, brush truck, portable pump, etc) to support jet siphons.
- Adaptors and fittings are always critical at any water supply operation. It is important to carry multiple sets of fittings and adaptors so that all phases of water supply operations can be supported.

# The Lessons Learned

- Having different size and type of direct fill connections can drive a fill site crew crazy. Standardization of tanker fill connections will help reduce fill time by making the connection process simpler.
- The “bundling” of water hauling mutual aid resources has proven successful in many drills. The tanker task force concept is an effective process for requesting and using additional rural water supply resources.

# The Lessons Learned

- Vacuum tankers are probably one of the most significant innovations in rural water supply operations. One of their key advantages is that a fill site pumper and crew is not needed – the vac tanker can just go fill itself.
- At this drill, the vacuum tanker hauled 15,000 gallons of water.
- For departments suffering staffing problems – having a vacuum tanker arrive early in an incident can make a big impact because it can offload and go reload with little need for additional resources.

# Summary

- The drill was a success. For the new folks, they got to see how "it is supposed to done."
- For the older, experienced folks, it was a chance to practice their "craft."
- The success of the drill showed the importance of mutual aid response practices and procedures – and the importance of mutual aid interoperability.
- Much thanks to the Pine Mountain Volunteer Fire and EMS District for sponsoring and hosting this seminar.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