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Shelby County Fire & EMS Association and The Calera Fire Department Calera, Alabama

Rural Water Supply Operations Seminar 2-hr Water Supply Drill – August 14, 2011 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

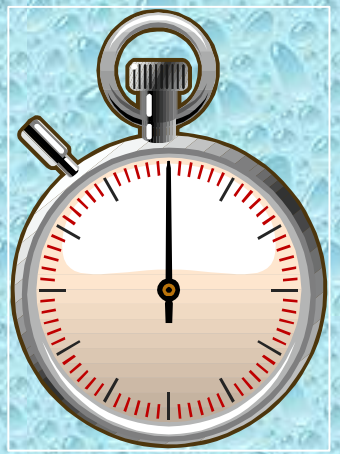
- The seminar started with a 6-hour session to review the basics of rural water supply operations.
- The review session was held at the Shelby County Fire Training Center located in Calera, Alabama.
- Seminar topics included the history of rural water supply, tanker construction, dump site operations, fill-site operations, tanker shuttle operations, and drafting.
- Seminar participants were from the Shelby County and central Alabama Area.

The 2-hour Water Supply Drill

- The tanker shuttle drill was held on August 14, 2011, at a new development site in Calera, 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 twelve different fire departments in Central Alabama area and the water hauling apparatus was representative of the type of water supply support that would respond to a structure fire in the Calera area.*

Drill Participants

- Calera Engine 22
  - 1,500 gpm pump w/1,000 gal tank
- Calera Engine 21
  - 1,500 gpm pump, w/1,000 gal tank

Drill Participants

- Brierfield Engine 202
  - 1,500 gpm pump w/500 gal tank
- Brierfield Engine 201
  - 1,250 gpm pump w/1,000 gal tank

Drill Participants

- Brierfield Engine 203
  - 1,500 gpm pump w/500 gal tank
- Pea Ridge Engine 101
  - 1,250 gpm pump w/500 gal tank

Drill Participants

- Four Mile Engine 261
  - 1250 gpm pump w/1,000 gal tank
- County 17 Tanker 213
  - 1,500 gpm pump w/2,000 gal tank

Drill Participants

- Four Mile Tanker 262
  - 300 gpm pump w/2,200 gal tank
- Four Mile Tanker 263
  - 1,800 gal tank

Drill Participants

- Pea Ridge Tanker 101
  - 500 gpm pump w/1,850 gal tank
- West Shelby Engine 241
  - 1,250 gpm pump, w/1,000 gal tank

Drill Participants

- Kingdom Tanker 2
  - 1,500 gal tank
- Summer Hill Tanker 284
  - 2,500 gal tank

Preparation

Units began the day at the Shelby County Fire Training Center where an operational briefing was conducted and crews were given assignments.

The Drill Begins

With everyone ready, Calera Engine 22 arrives on the scene and lays a 5-inch supply line to where they will stop and deploy a portable master stream device. The stop watch is started and timing begins.

The Drill Begins

Engine 22 laid 300 feet of supply line and the crew advanced a 100-ft, 3-inch line with a pre-connect monitor.

Nurse Tanker Operations

Meanwhile, Calera Engine 21 arrives and prepares to give its water to Engine 22 via the manifold on the 5-inch supply line. While this technically is not a nurse tanker operation – it uses the same principle. This is the advantage of having a control valve or manifold at the end of your LDH supply line.

Nurse Tanker Operations

The use of the manifold at this drill made a big difference in sustaining the water flow. It allowed pumpers to pump off their water in lieu of blocking out tankers trying to dump at the dump site.

Water Flow Starts

At the 3:59-minute mark (a bit early), water flow is started at 250 gpm using a fixed-pitot on the monitor for accuracy in flow measurement.

Nurse Tanker Operations

Four Mile Engine 261 arrived around the 7:00-minute mark and prepared to pump off its 1,000-gallons of water to the attack engine as well. With no tankers yet to arrive, no dump tanks were available – so setting up a dump site was a bit difficult.

Incident Command

Chief Sean Kendrick from the Calera FD assumed the command and began managing the operation. The command structure used several components to manage dump and fill operations as well as a Staging Area.

Nurse Tanker Operations

With the arrival of the first tanker, a decision was made to gravity nurse from the 2,200-gallon unit. This probably was not the best decision, because the rear 2-1/2-inch outlet could not support the 250 gpm flow being attempted. The tanker did have a 300 gpm pump, which most likely would have proven more useful – but it was not used.

1st Dump Tank

County 17's engine/tanker arrived around the 10:00-minute mark and crews began to get the dump site set-up while the other engines continued to pump off their water to the attack engine.

2nd Dump Tank

A second dump tank got set up pretty fast and the crews continued to build out the dump site. However, water flow was lost at the attack engine at the 10:28 minute mark – but was restarted 15 seconds later.

1st Tanker to Dump

Summer Hill Tanker 284 was the first tanker to dump its water into the dump tanks – this occurred around the 18:00 minute mark of the drill.

Additional Tankers Arrive

About a minute later, Pea Ridge Tanker 101 arrived and dumped its water and the operation transitioned to a tanker shuttle operation as opposed to a nurse-pumper-tanker operation.

3rd Dump Tank

A third dump tank was placed into operation as additional tankers arrived and provided dump tanks. Note the use of the portable signs – they help the tanker drivers to identify what tank to dump into.

Water Flow Increased

At the 20:03 minute mark, the water flow was increased to 500 gpm. The timing of the increase was a bit late but that was due to some delay in getting the dump site fully operational.

Dump Tank Operations

With three dump tanks now in operation, the water transfer process became important.

Dump Tank Operations

Water flow was backed down to 250 gpm at the 25:00 minute mark because of some issue with water transfer operations at the dump site. When those were fixed, flow was moved back to 500 gpm.

Supporting the Attack

The LDH manifold that was originally laid out by the first arriving engine made a huge difference in sustaining flow. The pumpers shown on the left above, were able to pump off their water into the manifold without interfering with tankers trying to dump. County 17 Tanker 213 (right) used its hi-flow discharge to support the LDH manifold while drafting from the dump tanks.

Supporting the Attack

While not as efficient as a clappered device, this LDH manifold served its purpose quite well.

Water Transfer Operations

In order to support jet siphon operations, a brush truck was brought in to run a jet siphon. The problem that occurred was that the pump could not generate quite enough pressure to make the jet siphon work properly. So the brush truck was eventually removed from the operation.

Water Transfer Operations

The jet siphons were run by County 17 Tanker 213 who also served as the draft engine for the dump site.

Tie Up Those Drains

A common problem seen at many drills is the dump tank drain not secured. While it is unlikely to lose the contents of your tank, it does make a big mess which can cause problems during long term operations.

Dump Site Operations

Around the 31:00 minute mark, the first tanker was back and ready to dump. Three dump tanks were also in operation by that time.

Critical Dump Time

One question that often arises is, how long do you dump water? There is a point where the cost of waiting to finish off-loading outweighs the benefit of being on the road to get more water. In the photo above, that tanker needs to be on the road!

Critical Dump Time

So at this drill, we marked a line on the dump chute to show folks when to stop dumping and get back on the road for another load of water. On a square dump and level ground, this normally occurs around the 1/4 –height mark on the chute.

Critical Dump Time

When the water hits the black line – the valve is closed and the tanker takes off for another load.

4th Dump Tank

At the 41:00-minute, Kingdom Tanker 2 arrived and used its water to get a fourth dump tank in operation.

Dump Site Operations

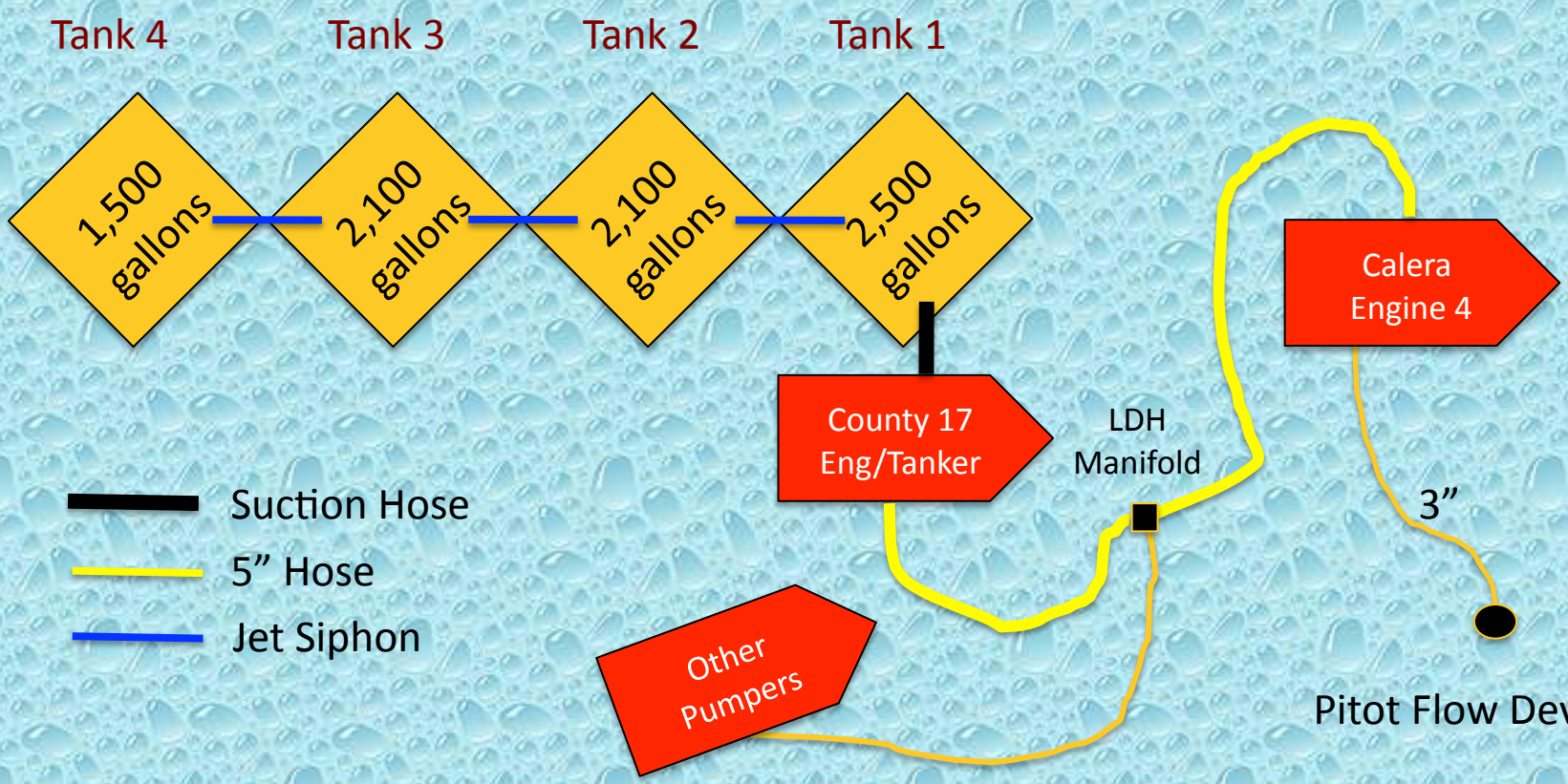
By the 50:00 minute mark, dump site operations had stabilized and the water hauling cycle was as efficient as it was going to get given the resources provided.

Dump Site Operations

At the 108:00 minute mark, the flow was moved to 558 gpm where it stayed for the remainder of the drill.

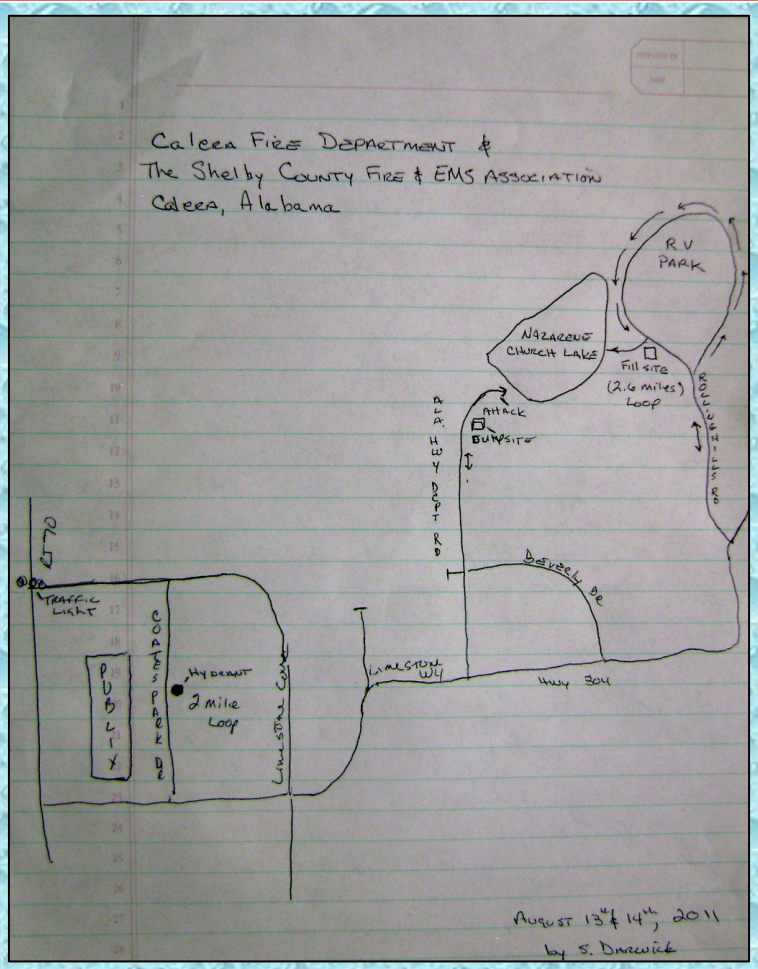
Dump Site Layout

**Note – a few arrangements were tried – this one was most functional.*



The Fill Sites

- For this drill – two fill sites were used – one a pond and the other a fire hydrant
- The pond site provided a 2.6-mile round trip and the hydrant a 2.0-mile round trip.



Pond Fill Site

Brierfield Engine 203 was the first pumper to arrive at the pond fill site and the crew made quick work of getting a fill station set-up. A 5-inch supply line was layed from the loading area back to the drafting area and the line was trimmed out with an LDH manifold.

Pond Fill Site

The crew did a great job getting the site set-up. Resources were split so that some folks helped set-up for drafting while others worked on getting the tanker fill station organized.

Pond Fill Site

This fill site used a huge pond at a nearby campsite. Water quantity and quality was not an issue.

Pond Fill Site

Engine 203 set up dual suctions so that its capacity would be improved. This once again illustrates the importance of carrying more than 20-feet of hard suction hose on rural pumpers.

Pond Fill Site

Only one floating strainer – but two suction lines? No problem – make your own floating strainer. Engine 203's crew uses an empty foam bucket as a float for a barrel strainer – thus – a floating strainer. It worked just fine!

Pond Fill Site

Of course – you can also make a floating strainer using a human if needed. But that often is not a good use of manpower.

Pond Fill Site

The pond fill site had such great access that a second fill station was set-up using Pea Ridge Engine 101.

Fill Site Operations

Use of an LDH manifold makes the “loader’s” job so much easier. The valve allows for close control of filling operations with minimal impact on the pump operator.

Fill Site Operations

Staffing is important at a fill site. Ideally, the tanker driver should never have to get out of his rig to help.

Fill Site Operations

This tanker has dual fill lines each equipped with a check valve and camlock fittings. This arrangement allows for quick connect and disconnect operations.

Fill Site Operations

Tanker fill lights are nice – but she is full when she overflows – remember that.

Hydrant Fill Site

West Shelby Engine 241 was assigned to operate the second fill site which used a fire hydrant near a large shopping complex.

Hydrant Fill Site

The site was set-up to simulate a low-flow hydrant (<1,000 gpm). The crew used a dump tank which was kept full via the fire hydrant.

Hydrant Fill Site

When a tanker arrived for filling, Engine 241 drafted out of the dump tank and filled the tanker. The rate at which the engine could draft and fill was faster than what the hydrant could have provided by itself. This “open” relay is very useful when faced with low flow hydrants.

The Results

- The drill was stopped after two hours.
- Water flow was interrupted twice – once at the 10:28-minute mark and once at the 21:21-mark.
- In both cases, water flow was stopped because of the ability to pump off water to the attack engine.
- An estimated 46,322 gallons of water were flowed through the attack engine during the drill - producing an average flow rate of 413 gpm.

The Lessons Learned

- Nurse tanker operations can be successful as long as everyone knows the limitations prior to use. At this drill, only one tanker (County 17) had the ability to pump off water at a rate over 500 gpm, yet it was not put into operation as a nurse tanker and the attack engine ran out of water.
- A control valve on a suction intake can really improve drafting operations. At this drill, the lack of a suction control valve resulted in an interruption of flow when the blind cap had to be removed in order to connect suction hose to the pumper.

The Lessons Learned

- The gravity nurse of the Four Mile tanker did not work so well because of the 3-inch suction hose and the higher demand for water flow.
- While the use of the brush truck showed some good thinking, its pump could not develop adequate pressure for running a jet siphon.
- Four dump tanks were used at the drill, but they all were smaller in size (<2,500 gal) – when the 558 gpm mark was reached, water transfer operations had to move water too many times.

The Lessons Learned

- 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.
- 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 Lessons Learned

- 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.
- Tankers should be marked on all four sides with their unit numbers. When operating at large, mutual aid incidents, group supervisors and command staff may not recognize a tanker – so identification markings are important.

Summary

- The drill was a success. For the new folks, they got to see how dump tank operations work.
- 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.
- Many thanks to the Calera Fire Department and the Shelby County Fire and EMS Association for sponsoring and hosting this seminar.

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This program was developed by
GBW Associates, LLC

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