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Brierfield Volunteer Fire and Rescue, Brierfield, Alabama

Rural Water Supply Operations Seminar
2-hr Water Supply Drill – May 16, 2010
Summary Report

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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.

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The Seminar

- The seminar started with a 6-hour session to review the basics of rural water supply operations.
- The review session was conducted at Montevallo University located in Montevallo, 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 around the Montevallo area.

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The 2-hour Water Supply Drill

- The tanker shuttle drill was held on May 16, 2010, at Montevallo University.
- 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.

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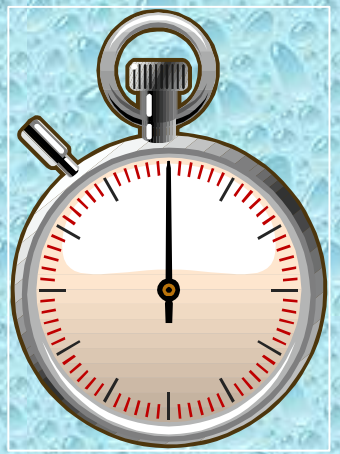
The ISO Test

- 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



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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.

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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.

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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!

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Water Supply Drill Participants

- *The participants for the drill were from eleven different fire departments and the apparatus was representative of the type of water supply support that would respond to a fire in the Montevallo area.*

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Drill Participants

- Brierfield Engine 201
  - 1250 gpm pump w/1,000 gal tank

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

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Drill Participants

- Brierfield Engine 203
  - 1,500 gpm pump w/500 gal tank
- Brierfield Tanker 200
  - 3,000 gal tank

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Drill Participants

- Lawley Tanker 6
  - 3,000 gal tank
- North Chilton Tanker 18
  - 1,250 gpm pump, w/2,000 gal tank

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Drill Participants

- Pea Ridge Tanker 101
  - 500 gpm pump w/1,850 gal tank
- Pea Ridge Engine 101
  - 1,000 gpm pump w/750 gal tank

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Drill Participants

- County 17 Engine 212
  - 1,250 gpm pump w/1,000 gal tank
- West Shelby Engine 242
  - 1,000 gpm pump w/750 gal tank

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Drill Participants

- Dry Valley Engine 51
  - 1,250 gpm pump w/1,000 gal tank
- Green Pond Tanker 3
  - 2,000 gal tank

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Drill Participants

- Water Master Vacuum Tanker
  - 3,500 gal tank w/500 gpm pump
- Montevallo Truck 84
  - 1,500 gpm pump w/300 gal tank

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Preparation

Units staged on the campus of Montevallo University and crews received a briefing in the Comer Auditorium where they reviewed the goals and objectives of the drill as well as safety issues.

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The Drill Begins

With everyone ready, the drill started. Montevallo Truck 84 (a tower) set-up for elevated master stream operations and Brierfield Engine 202 laid 400 feet of 5-inch supply line. As soon as E202 came to a stop – the clock was started.

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The Drill Begins

Brierfield Tanker 200 and E201 were next to arrive on the scene. E201 set up to pump its water to E202 and Tanker 200 began to set-up for dump tank operations.

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Dump Site Set-Up

The first tank down was a 3,000 gallon one and crews work quickly to get the dump site set-up.

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Nurse Operations

Engine 201 sets up to supply Engine 202 with its 1,000 gallons of water. When combined with E202's 500 gallons, this should provide about 5 to 6 minutes of a 250 gpm flow once the 5-minute start point arrives.

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First Line Stretched

The first line is being stretched to a “rapid attack” monitor so that the 250 gpm flow can be started. At the 4:30-minute mark, the line is ready to be charged.

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Dump Site Set-Up

Meanwhile, crews hustle to build out the dump site. Suction hose is connected to Engine 202 (1,500 gpm) which will serve as the dump site pumper.

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Dump Site Set-Up

With the site just about ready, Tanker 200 gets into position to dump its 3,000 gallons of water.

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Dump Site Set-Up

Tanker 200 dumps its load as Engine 202 works to get a prime.
Timing is everything during the first 15 minutes of the ISO drill.

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Water Flow Started

At the 6:45 minute mark, water flow is started to the rapid attack monitor using the tank water from the two engines.

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Dump Site Operations

A second tank (2,100 gallons) is set-up as the dump site continues to expand.

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More Tankers Arrive

At the 9:51 minute mark, Pea Ridge Tanker 101 arrives at the dump site and positions to offload its 1,850 gallons of water.

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Three Dump Tanks

At the 14:11-minute mark, a third dump tank (2,100 gallons) is set into position and more units begin to arrive on scene.

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Water Transfer Operations

With three dump tanks now in position, Brierfield folks use two of their homemade 6-inch PVC jet siphons to begin transferring water.

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Jet Siphons

The homemade jet siphons were quite effective in transferring water and they freed up suction hose for use at other locations if needed.

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Vacuum Tanker Operations

One of the features of the drill was a 3,500-gallon Water Master vacuum tanker provided by the folks from E-One. The tanker is shown above offloading its water under pressure.

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Dump Site Operations

At the 21:00-minute mark, Tanker 200 returns from the fill site – the first tanker to return. The tanker is shown above dumping its water into the primary drafting tank because water levels are running low.

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Dump Site Operations

A fourth dump tank (2,100 gallons) is added as more units arrive on the scene.

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Color Helps

"Hey Johnny, go shut down this 2-1/2 at the manifold." Hey Johnny, go shut down the blue line at the manifold." Which one is easier for the new guy to do? That is why color coding can really simplify operations.

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Dump Site Operations

After troubleshooting a couple of items, water is finally sent to Montevallo's tower. Two, 3-inch lines from Engine 202 were used to supply the LDH manifold.

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Dump Site Operations

The pump control panel for Engine 202 is located inside the cab – a feature not often seen in Alabama. As usual, the dump site pump operator got a workout!

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Water Flow Increased

At the 24:30-minute mark, the flow was increased to 500 gpm and the tower's flow meter was used to monitor the flow rate of the water being discharged.

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Dump Site Operations

Around the 51:00-minute mark, a small snafu occurred at the tower and water flow was diverted to Engine 202's deck gun at 500 gpm.

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Dump Site Operations

With dump site operations now stabilized, a plan was developed to move the flow to 800 gpm.

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Dump Site Operations

The photo above is a good depiction of transferring water. The jet siphon shows a solid stream of water - which should be in the neighborhood of an 800 to 1000 gpm flow.

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Pumpers Hauling Water

A couple of pumpers were used to haul water and they pumped off their water to the “gooseneck” fittings attached to the primary dump tank.

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Pumpers Hauling Water

The pumpers hauling water pulled past the dump tanks and pumped their water back to the site via dual, 3-inch lines. This prevented the pumpers from blocking out the tankers who were trying to dump their water.

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Adaptors

As always stated in the classroom portion of the seminar, one can never have too many adaptors. The 5”x6” Storz adaptor above came in handy at this drill.

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Vacuum Tanker Offloads

The Water Master vacuum tanker is shown above with its powerful offload capability. Its 6-inch dump can dump at a rate of 1,750 gpm when the tank is pressurized.

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Water Transfer Operations

Of course, as flows increase – so does the need for transferring water from tank to tank. Therefore, additional jet siphons - and perhaps an additional pumper might be needed.

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Keeping It Moving!

The pumper shown above was put into operation to run the jet siphons and supply a third, 3-inch line to the LDH manifold as a flow increase to 800 gpm was attempted.

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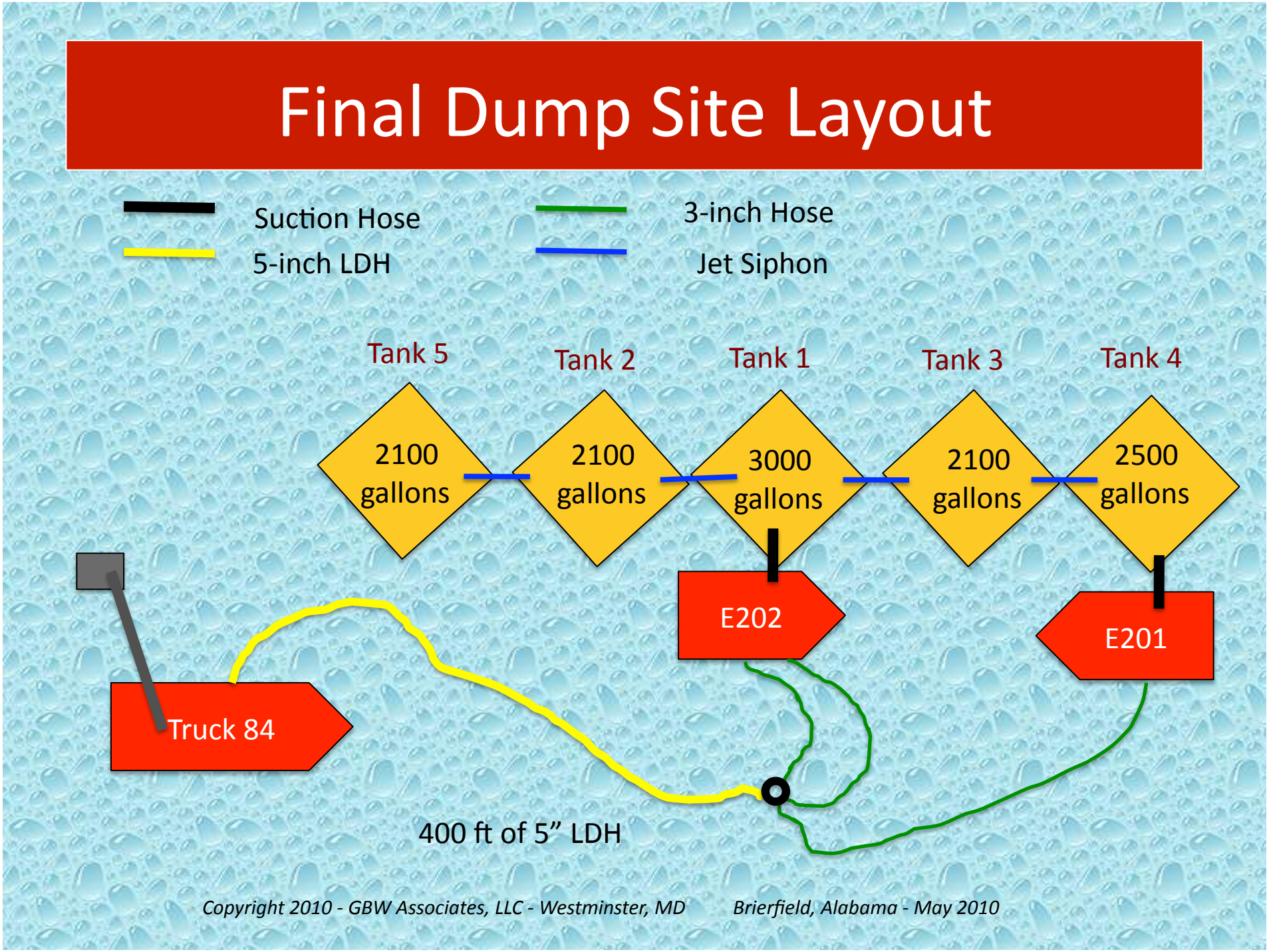
Final Dump Site Layout



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The Fill Sites

- For this drill – one fill site (Park Drive) was used - but two fill stations were set-up there.
- The site was a creek in a local park near downtown Montevallo. The fill site provided a 2.2-mile roundtrip.
- A second fill site was considered but never made operational. That site was a fire hydrant also located near downtown Montevallo. The success of the creek fill site eliminated the need for setting up the second site.

Park Drive Fill Site

This creek provided plenty of water and plenty of access for drafting. Pea Ridge Engine 101 (1,000 gpm) is shown above arriving on scene and positioning to set-up to draft.

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Park Drive Fill Site

Like the dump site operations, the crews here work hard to get the fill site up and running by the time that the first tanker arrives.

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Park Drive Fill Site

Folks are shown deploying a 5-inch line to use as a tanker fill station. Others are shown bringing equipment to the draft pumper.

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Park Drive Fill Site

The success of a fill site really depends on the people and equipment. The crews did a great job at this drill – no tanker had to wait for the site to be set up.

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Park Drive Fill Site

The first suction line was outfitted with a barrel strainer and an empty bucket as a floatation device – thus making a floating strainer. Great thinking!

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Park Drive Fill Site

In Maryland – this might be a crab pot. In Shelby County, Alabama – it is a FD suction strainer.

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Park Drive Fill Site

To improve the capability of this 1,000 gpm pumper, both the driver and officer side suctions were used.

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Park Drive Fill Site

Also to improve capability, a clappered siamese was used because the pumper had no high-flow, LDH discharge. While no test data was gathered, the improvised set up seemed to work okay – short of some leakage.

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Park Drive Fill Site

When using LDH for tanker fill operations, a manifold is always helpful – it provides control over the water flow, a pressure gauge for accurate supply pressure settings, and a relief valve.

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Park Drive Fill Site

If a manifold is not available – then traditional devices can be used – assuming the correct adaptors are present.

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Park Drive Fill Site

The fill site was ready when Tanker 200 arrived –which was the first tanker empty. Tanker 200 was filled using dual, 3-inch fill lines.

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Park Drive Fill Site

This TFT intake valve is rated for suction operations and is controlled by an electric motor. In addition, the use of the long-handled, Storz suction fittings makes it easier for the driver/operator to make and break suction hose connections.

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Park Drive Fill Site

A portable monitor is used as a recirculation line – thus insuring a prime is not lost.

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Park Drive Fill Site

This person operates as the “loader” by using the LDH valve to control fill operations.

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Park Drive Fill Site

With the first fill station operational, additional tankers begin to arrive.

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Park Drive Fill Site

Brierfield Engine 203 (1,500 gpm) sets up to support the operation of a second fill station. Above, a high-flow, floating strainer is shown being deployed.

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Park Drive Fill Site

Pea Ridge Engine 101 is set up to maximize its ability to draft and supply water for filling tankers. Great Job!

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Park Drive Fill Site

Another color-coded LDH manifold in use – note the adaptors readily available. Once again – you can never have too many adaptors at a tanker fill site.

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Park Drive Fill Site

At first glance, it appears as just some extra suction hose laying around. It actually is the fill site for the vacuum tanker. Once deployed – the equipment is left in place for each return trip.

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Park Drive Fill Site

The 3,500 –gallon vacuum tanker arrives at the fill site and the driver – BY HIMSELF – makes the connection and fills the tanker at over 1,000 gpm! No fill site crew needed, which one of the key benefits of a vacuum tanker.

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Park Drive Fill Site

The vacuum tanker carried 30 feet of hard suction and it was used along with a floating strainer to access the creek.

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Park Drive Fill Site

Both pumpers are shown in operation – each supporting a tanker fill station.

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Park Drive Fill Site

A good example of a high-flow discharge in use. When designing or rehabbing a pumper, a high-flow discharge is an item that should always be included.

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Park Drive Fill Site

Lawley's 3,250-gallon tanker has dual fill lines, each with a check valve as the control point. The tanker is shown above being filled at the tanker fill site.

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The Results

- The drill was stopped after two hours.
- Water flow was late getting started at the 6:45-minute mark and was lost twice during the drill – once at 47:10 minutes and once at the 69:00 minute mark.
- An estimated 65,387 gallons of water were flowed during the drill producing an **average flow rate of 615 gpm during the 106 minutes that water was flowing.**

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The Lessons Learned

- Water flow was not started until the 6:45-minute mark due to some delay in getting the dump site up and running. Folks got a bit focused on setting up tanks instead of supplying the attack line.
- Fortunately, the line was charged and water flow was started once the problem was recognized.
- At the 24:30 minute mark, the flow was moved to 500 gpm – which was a bit late. The drafting pumper had some troubles running jet siphons and supporting the tower –a mechanical issue was discovered and the crews used a second pumper to take over jet siphon operations.

The Lessons Learned

- Adaptors are critical to the success of any tanker shuttle drill. At this drill, the tankers had various types of fill connections – so having the right adaptors at the fill site was a huge issue.
- Pumpers can contribute to a shuttle - but don't let them block out a tanker in the offloading line. Pumpers in this drill pulled past the dump site and pumped off their water via 3-inch hose back to the dump tanks.

The Lessons Learned

- LDH fill lines certainly make a huge difference – that practice was reinforced at this drill.
- Mutual aid resources must "work on the same page." With the exception of some adaptor issues – all companies worked together very well.
- When calling for additional resources, the concept of grouping those resources together seems to work well. At this drill, units were bundled into "a water supply task force" which brought three tankers and a pumper to the scene.

The Lessons Learned

- The vacuum tanker at this drill clearly displayed its capabilities. While the vacuum tanker was dispatched as part of the first water supply task force after the initial alarm – it was the t**hird** tanker to return to the dump site to dump a second load of water.
- What this means is that the vacuum tanker's ability to load itself quickly resulted in it passing other tankers who were loading at the traditional fill site.

Summary

- The drill was a success. For the new folks, they got a chance to see how all of the water supply parts "come together."
- 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 need for common fill connections.
- Much thanks to the Brierfield Volunteer Fire & Rescue for hosting this seminar.

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For more information contact us at
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