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Adams County, Pennsylvania

Rural Water Supply Operations Seminar
2-hr Water Supply Drill – June 6, 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.

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 the Adams County Volunteer Emergency Services Association's Training Center located near Gettysburg, Pennsylvania.
- 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 Pennsylvania and Maryland.

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The 2-hour Water Supply Drill

- The tanker shuttle drill was held on June 6, 2010, at the Adams County VESA Training Center.
- 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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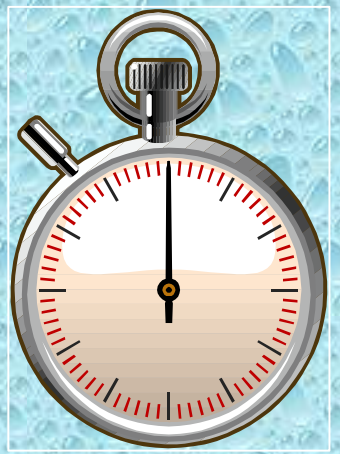
The ISO Test

- 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



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!

Water Supply Drill Participants

- *The participants for the drill were from sixteen different fire departments in two states and the water hauling apparatus was representative of the type of water supply support that would respond to a structure fire in Adams County.*

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Drill Participants

- Gettysburg Engine 1-1
  - 1,500 gpm pump w/750 gal tank

- Bonneauville Engine Tanker 19
  - 1,750 gpm pump, w/1,800 gal tank

Drill Participants

- Biglerville Engine 6
  - 1,500 gpm pump w/800 gal tank

- Fountaindale Engine Tanker 3
  - 1,500 gpm pump, w/1,800 gal tank

Drill Participants

- Barlow
  Engine Tanker 22-2
  - 1,750 gpm pump w/1,500 gal tank

- York Springs Tanker 9
  - 1,500 gpm pump, w/2,600 gal tank

Drill Participants

- United Tanker 33
  - 1,250 gpm pump w/1,500 gal tank

- Pleasant Valley Tanker 6
  - 1,500 gpm pump, w/3,200 gal tank

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Drill Participants

- Pleasant Valley Engine 63
  - 1,500 gpm pump w/1,000 gal tank
- Pleasant Valley Special Unit 6
  - 1,500 gpm pump, w/500 gal tank

Drill Participants

- Littlestown Engine Tanker 20
  - 1,500 gpm pump w/2,500 gal tank
- Heidlersburg Tanker 25
  - 750 gpm pump, w/3,300 gal tank

Drill Participants

- Cashtown Engine 4-3
  - 1,000 gpm pump w/1,000 gal tank

- Greenmount Engine Tanker 23
  - 1,250 gpm pump, w/1500 gal tank

Drill Participants

- SAVES
  Engine Tanker 29
  - 1,500 gpm pump w/1,500 gal tank

Preparation

Units staged at the Adams County Training Center where an operational briefing was conducted outlining the objectives for the drill. Safety issues were also reviewed.

The Drill Begins

With everyone ready, the drill started. Gettysburg E1-1 (left) stops to layout a 5-inch supply line. Bonneauville ET19 arrives shortly thereafter. Once E1-1 completes its supply hose layout – the clock will start.

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The Drill Begins

Engine 1-1's crew lays out the supply line and gets ready to go to work as the attack engine.

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Attack Engine Lays Out

The clock starts running when E1-1 sets their parking brake. The crew now has 5-minutes before they have to start flowing water at 250 gpm.

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Dump Site Set-Up

ET19 positions and begins setting up for a dump tank operation. The intent is to be ready to support the attack engine as soon as possible.

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Dump Site Set-Up

The attack engine's (E1-1) crew begins setting up for the initial water flow and for expansion of that flow when the time arrives.

Dump Site Set-Up

Meanwhile, at the dump site, ET19's crew hustles to get the first dump tank (2100 gallons) set-up and ready for the arrival of tankers. This feat is accomplished at the 4:00-minute mark.

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Dump Site Set-Up

Fountaindale ET3 (1800 gallons) is the first tanker to arrive on the scene. With the 5-minute mark not yet reached, a decision must be made whether to dump the tanker or use the tanker in a nurse tanker mode.

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Dump Site Set-Up

The dump site engine works to set-up for a drafting operation. The 1750 gpm pumper intends to use 5-inch hose to feed one side of a 5”x5”x5” “jumbo” gated wye.

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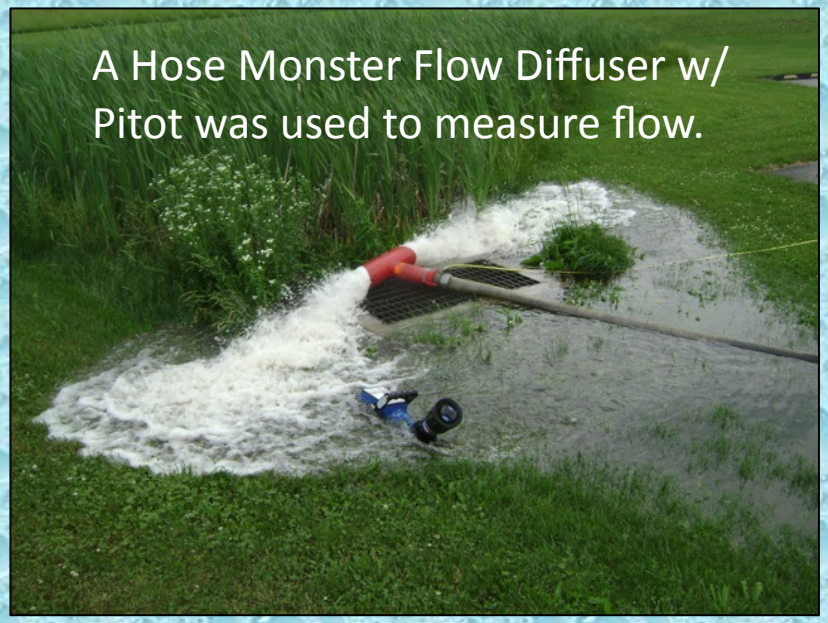
Water Flow Starts



Water flow was started early – 280 gpm at the 2:30-minute mark. Perhaps the attack engine crew was a bit anxious to get started! Flow was stopped at the 4:30-minute mark to allow crews to reassemble and start flowing again at the 5:00-minute mark as planned.

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Dump Site Set-Up

With flow at a halt, a decision was made to have ET3 transition to a nurse tanker operation. The crew is shown above stretching a 5-inch line to support the jumbo wye already in place.

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Dump Site Set-Up

The dump site crew awaits water from ET3 so that the attack engine can again be supported.

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A Problem Arises

ET19 does not have a control valve on its driver's side suction inlet. Thus , when trying to pump to the attack engine using onboard water, much of the water back feeds through the suction hose into the dump tank. Without some type of control valve on your suction inlet, it is difficult to use onboard tank water and set up for drafting at the same time.

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Nurse Operations

With ET3 now supporting the attack pumper's needs via the jumbo wye, water flow is sustained at the 8:21-minute mark.

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Two Dump Tanks

Biglerville E6 arrives and takes a position to the rear of the dump site engine in order to draft and operate jet siphons – all in anticipation of moving to a higher flow rate.

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More Tankers Arrive

Tankers from the 1st Tanker Task Force begin to arrive around the 10:00-minute mark. The idea of "bundling" additional resources aids the incident commander during incident management because it helps ensure that adequate equipment and personnel arrive in a timely and effective manner.

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Dump Site Operations

Pleasant Valley Tanker 6 (3200 gallons) was one of the first, large tankers to arrive. The tanker is shown above offloading its water into the primary dump tank.

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Dump Site Operations

With the primary dump tank now full, the operation begins transitioning from a nurse tanker operation to a dump tank operation.

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Dump Site Operations

Dump site crews work to expand the operation and to get E6 ready to support jet siphons.

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A Third Tank Placed

A third dump tank is placed and flow is moved to 524 gpm at the 19:00-minute mark.

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Water Transfer Operations

Water transfer operations are begun – the jet siphon above is a good example of what the flow should look like when the device is properly pressurized.

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Incident Command

- ICS for the drill was as follows:
  - IC = Captain Wasylyk (Gettysburg)
  - Water Supply = Chief Martin (Fountaindale)
  - Dump Site = Chief Phillips (Hampton)
  - Pond Fill Site = LT Marring (Barlow)
  - Hydrant Fill Site = FF Strasbaugh (Cashtown)

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Water Transfer Operations

With three dump tanks in use, the transfer of water between the tanks becomes critical to the success of the operation.

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More Tankers Arrive

Units from the second tanker task force begin to arrive in order to help support the 524 gpm flow. Meanwhile, dump site and attack engine crews begin preparing to increase the flow as soon as possible.

Dump Site Operations

SAVES Engine Tanker 29 is shown here just starting to offload its water. Note the ladder used to help space out the dump tanks – this allows more room for larger tankers to offload simultaneously.

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Fourth Dump Tank Added

At the 50:00-minute mark, a 4th dump tank was added to the operation to help support the needed flow.

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Flow Is Increased Again

At the 71:00 minute mark, operations had stabilized and the flow was moved to 750 gpm and then again to 794 gpm at 80:00 minutes - where it was sustained for the remainder of the drill.

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Water Transfer Operations

More water transfer operations in progress as Littlestown ET20 offloads its 2500 gallons of water.

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Improving Operations

In hopes of increasing the operation to 1000 gpm , the decision is made to feed the jumbo wye with two, 5-inch lines so that the flow can be fed using two discharges on the pumper instead of just one.

Improving Operations

In an effort to improve again, three discharges were used to feed the jumbo wye – however, two had to be reduced to 3-inch lines. This allowed the pumper to produce the same flow with less effort.

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Keeping It Moving!

With the dump site now fully-operational – the goal is to keep the water moving – which was accomplished without incident.

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Keeping It Moving!

Tankers line up to offload water. One issue that did arise was that the larger tankers could not dump their load into just one dump tank because all four dump tanks were either 2,500 gallons or smaller. This was not a major issue at this drill, but is certainly something to consider when using large tankers.

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Keeping It Moving!

Once again – an excellent photo showing what the stream from a jet siphon should look like. In terms of operating pressure – there is no exact number – just pump the siphon until the flow looks like the photo above.

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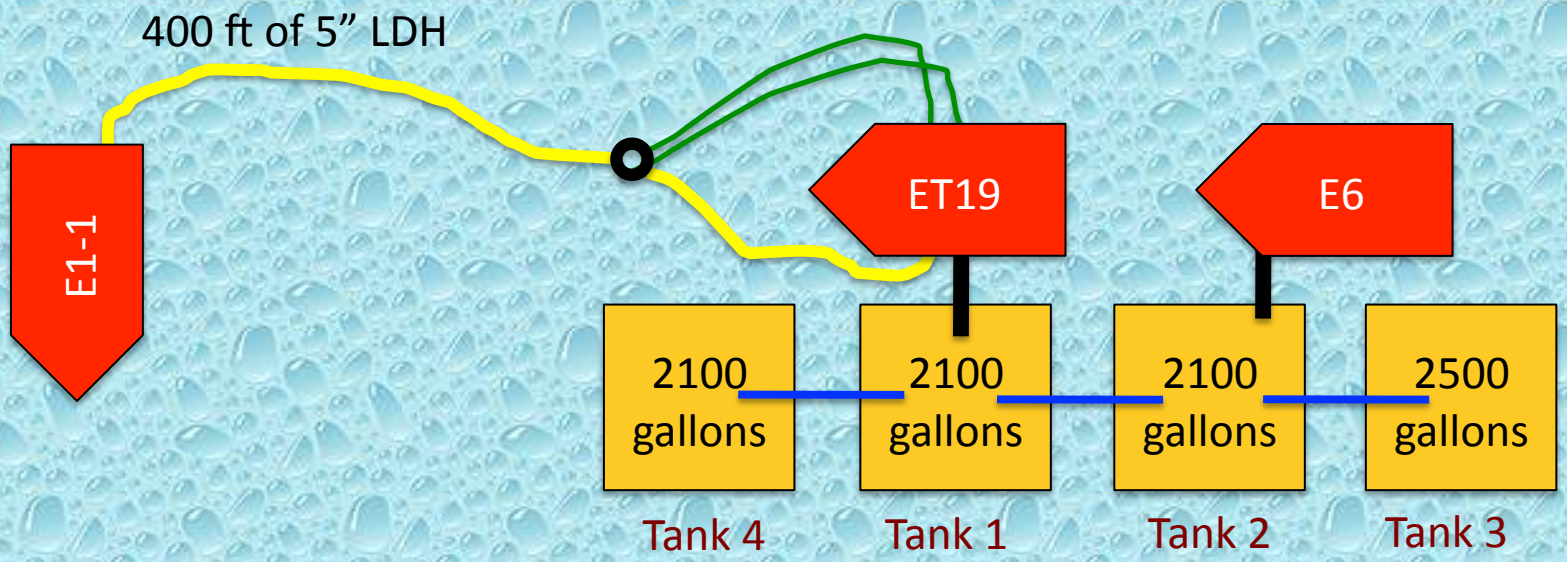
Dump Site Layout



Suction Hose

5-inch LDH

3-inch Hose

Jet Siphon

Note: Biglerville Engine 6 was used to help support jet siphon operations

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The Fill Sites

- For this drill – two fill sites were used – one at a pond on the training center grounds and one at a fire hydrant in a nearby industrial development.
- The training center's pond was quite large and crews were able to establish two fill stations at the site. Because the pond was close to the dump site, tankers were required to travel a longer route in order to generate the 2.2-mile roundtrip.
- The second fill site was a traditional fire hydrant that provided a 4.5-mile roundtrip for the tankers hauling water.

Training Center Fill Site

Barlow Engine Tanker 22-2 (1750 gpm) arrives at the pond and begins work on setting up a tanker fill site. The pond was located on the grounds of the training center – so the travel route for tankers was adjusted to add some distance.

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Training Center Fill Site

Barlow's crew hustles to get the site ready for when the first tanker arrives ready to be filled.

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Training Center Fill Site

Fill site staffing is very important. The photo here reinforces the need to have adequate staffing so that the site can be set-up quickly.

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Training Center Fill Site

30-feet of suction hose was used to access a deeper part of the pond. This again reinforces the importance of carrying more than the traditional 20-ft of suction hose on a pumper. Rural pumpers should carry 30 or 40-ft of suction hose so that then can have better access to draft sites in their response districts.

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Training Center Fill Site

With the suction hose now in place, the crew works on deploying a hose line for running the fill station.

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Training Center Fill Site

A 5-inch hose line is stretched and an LDH manifold is connected so that the filling operations can be controlled near the tankers – not at the pump panel of the fill site engine.

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Training Center Fill Site

Because the pond was so large, it provided the opportunity to establish two fill stations. Pleasant Valley Special Unit 6 (1500 gpm) was used to establish the second fill station.

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Training Center Fill Site

With the first fill station up and running, the crew from Special Unit 6 hustles to get a second station operational.

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Training Center Fill Site

The vehicle's all wheel drive capability allowed Special Unit 6 to position very close to the edge of the pond – perhaps a little too close for comfort.

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Training Center Fill Site

Fountaindale Engine Tanker 3 was the first tanker to arrive at the fill site. The rig is shown above being filled using dual, 3-inch lines.

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Training Center Fill Site

Pleasant Valley Tanker 6 (3200 gallons) is filled using a 5-inch fill hose – a much faster operation than the dual, 3-inch line scenarios.

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Training Center Fill Site

Even though a tanker may have a smaller fill line, LDH can still be used. The advantage in using LDH is that friction loss is minimized between the pumper and the tanker fill valve. Littlestown ET20 is shown above being filled using 5-inch hose.

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Training Center Fill Site

Engine Tanker 3 makes its second trip to the Training Center fill site.

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Training Center Fill Site

The two fill stations were set-up far enough part to allow tankers to maneuver through the site without interfering with each other. In the photo above, Barlow's fill station is shown in the background and the Pleasant Valley fill station in the foreground.

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Training Center Fill Site

A problem occurred at one of the LDH manifolds being used at the fill site. The crew had set it up in reverse to serve as a large drain for bleeding off pressure when disconnecting from a tanker. However, they also set-up fill lines off of the 2-1/2" fittings – which defeated the purpose. To fix that, they placed a 5-inch cap on one of the 5-inch inlets. The bottom line is that the photo above shows what happened. The crew did remedy the situation however.

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Training Center Fill Site

York Springs' tanker (2600 gallons) is shown above being filled using two different fill arrangements. As proven before, the use of LDH can shave valuable seconds/minutes off of a tanker's fill time – which translates to possibly one or two more loads of water that can be hauled in the 2-hour ISO test.

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Training Center Fill Site

Special Unit 6 maximizes its output by using dual suctions and dual, 5-inch discharges. The 1500 gpm unit easily flowed more than 2,000 gpm using this configuration.

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Hydrant Fill Site

Cashtown's Engine 43 (1000 gpm) established a second fill site at a hydrant located on Expedition Trail. The crew did a good job of maximizing their water intake by using multiple outlets on the hydrant.

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Hydrant Fill Site

Engine 43's use of LDH allowed it to operate as a fill site pumper with little difficulty.

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Hydrant Fill Site

One note for improvement would be to have used some type of siamese or manifold instead of connecting the 5-inch hose to a single, 2-1/2-inch discharge. Because E43 is an older pumper, it did not have a high-flow discharge – to correct that problem, simply pump from two discharges into one 5-inch line. In this case, dual 3-inch lines into a 5-inch line would most likely have improved their output ability.

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Hydrant Fill Site

Greenmount's Engine Tanker 23 (1500 gallons) is shown above being filled by the Cashtown pumper at the hydrant fill site.

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The Results

- The drill was stopped after two hours.
- Water flow was only interrupted once at the 15:30-minute mark when transition from a nurse operation to a drafting operation occurred.
- The flow was resumed in 3-1/2 minutes and was sustained for the remainder of the drill.
- An estimated 68,883 gallons of water were flowed through the attack engine during the drill producing an average flow rate of 607 gpm.

The Lessons Learned

- Water flow was started a bit early at the 2:30-minute mark due to a communications error. This resulted in already having expended over 500 gallons by the time the actual starting point arrived at 5:00 minutes.
- Fortunately, when problems were encountered at the dump site, quick thinking crews chose to move to a nurse tanker operation and used Fountaindale's engine/tanker to pump off its water to the attack pumper (Gettysburg E1-1).
- Once again, as seen in many of our drills – being able to function as a nurse tanker in the critical first moments of the ISO drill is an action that supports having a full-size fire pump on a tanker - *if one can afford it*.

The Lessons Learned

- When a water source is abundant enough to support two fill stations, get a second pumper there to create one. This will almost always be more successful than trying to have one pumper fill two tankers simultaneously.
- LDH fill lines certainly make a huge difference – that practice was once again reinforced at this drill.
- The "bundling" of water hauling mutual aid resources has proven successful in many drills – it did at this one as well. The tanker task force concept is an effective process for requesting and using additional rural water supply 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 Adams County Volunteer Emergency Services Association for sponsoring and hosting this seminar.

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This program was developed by
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