Franklin County, Maine

Rural Water Supply Operations Seminar

2-hr Tanker Shuttle Exercise
May 4, 2008
Summary Report

Overview

In May 2008, the Franklin County (Maine) Fireman's Association sponsored a rural water supply operations seminar and drill which was hosted by the Strong Fire Department and delivered by GBW Associates, LLC of Westminster, MD. This presentation is a summary of the seminar and the drill.

The Purpose

- The purpose of the rural water supply seminar was two-fold. First, the folks in Franklin County wanted a “refresher” on rural water supply operations and the opportunity for various departments to work together in a training environment.
- Second, the folks wanted an opportunity to improve their ability to operate a dump site using multiple dump tanks.

The Seminar

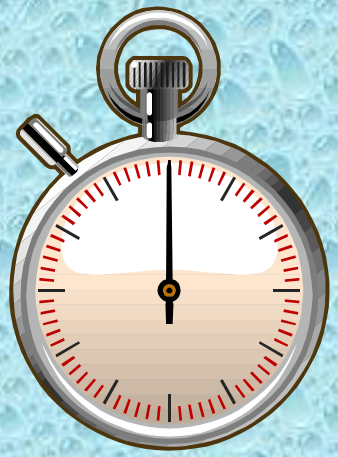
- In order to prepare for the drill, participants attended a 6-hour refresher seminar on May 3rd to review the basics of rural water supply operations. The seminar was delivered at the Foster Memorial Building located in Strong, Maine.
- Seminar topics included the history of rural water supply, tanker construction, dump site operations, fill-site operations, tanker shuttle operations, and drafting.

The Drill

- The water supply drill was held on May 4, 2008, in Strong FD's first-due area.
- The drill replicated the 2-hour Water Supply Delivery Test used by ISO in their evaluation of fire department water supply capabilities.
- The ISO 2-hour test is 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 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 for that location 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 when 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, whatever the flow rate is at that time, then that rate must be maintained for the remainder of the 2-hour test.

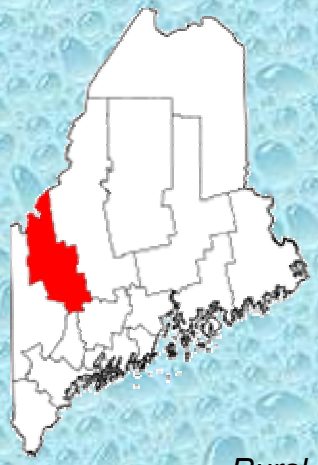
ISO Test: 15:01 to 120:00 Minutes

- Once the 15-minute mark has been reached, the remainder of the 2-hour test is really just about *sustaining* the flow.
- Most of these ISO drills include the simulation of mutual aid response and allow additional water supply units to arrive and assist in the delivery process as they would on a real incident.
- The real advantage of the ISO drill 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!

Drill Participants

The participants for the drill were from eleven different Franklin County fire departments and were representative of the type of water supply support that would respond to a fire in the Strong FD response area.



Drill Participants

- Strong Engine 1
  - 1250 gpm pump w/2500 gal tank

- Strong Engine 3
  - 1000 gpm pump w/1000 gal tank

Drill Participants

- Strong Tanker 5
  - 2500 gal tank

- Phillips Engine 4
  - 1000 gpm pump w/ 3000 gal tank

Drill Participants

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

- New Vineyard Tanker 1
  - 2300 gal tank

Drill Participants

- New Sharon Tanker 1
  - 2500 gal tank w/1250 gpm pump

- Eustis Tanker 5
  - 3000 gal tank w/1250 gpm pump

Drill Participants

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

- Farmington Engine 2
  - 1500 gpm pump w/1000 gal tank

Drill Participants

- Kingfield Tanker 3
  - 2500 gal tank w/500 gpm pump

- East Dixfield Tanker 1
  - 2000 gal tank w/200 gpm pump

Drill Participants

- Carrabassett Multi 1
  - 1250 gpm pump w/750 gal tank

- Rangeley Tank 2
  - 2000 gal tank w/250 gpm pump

The Drill Begins

Strong Engine 3 arrives on scene with a 2-person crew and the clock starts ticking. *(The fella to the far right is one of the instructors)*

Deploying an Attack Line

Engine 3's crew deploys a 2-1/2-inch preconnect line and prepares to set-up a TFT Blitzfire nozzle. Chief Scott Dyar (Strong FD) establishes the command.

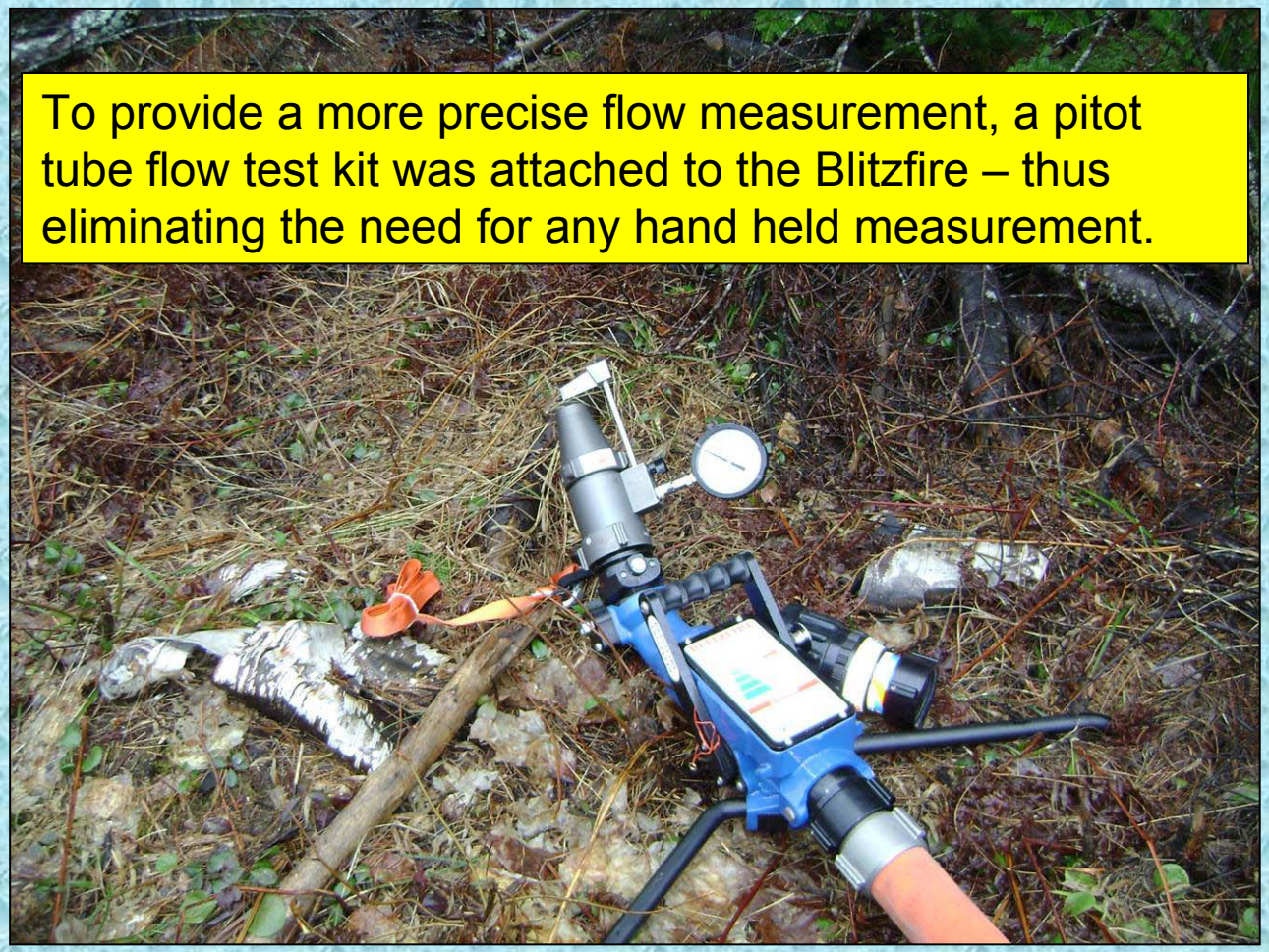
Deploying an Attack Line

During the first segment of the ISO test, it is important for everyone to work together to get that initial hose line in place so that water can start flowing at the 5-minute mark.

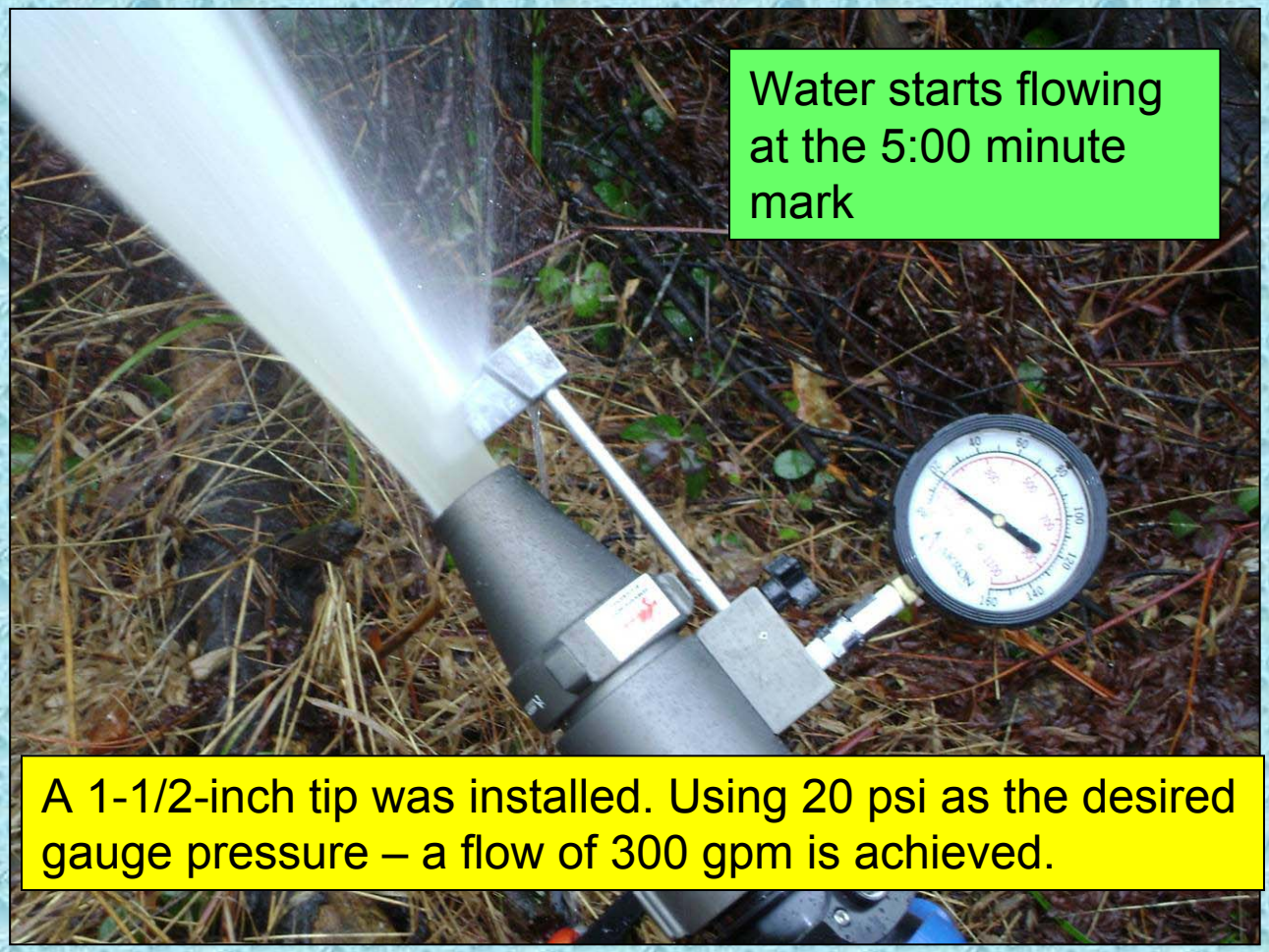
Deploying an Attack Line

With the line stretched, the driver breaks the connection.

Flow Measurement



Flow Measurement



Dump Site Set-up

With water now flowing, an additional firefighter arrives and the first dump tank (2,100-gallon) is set-up.

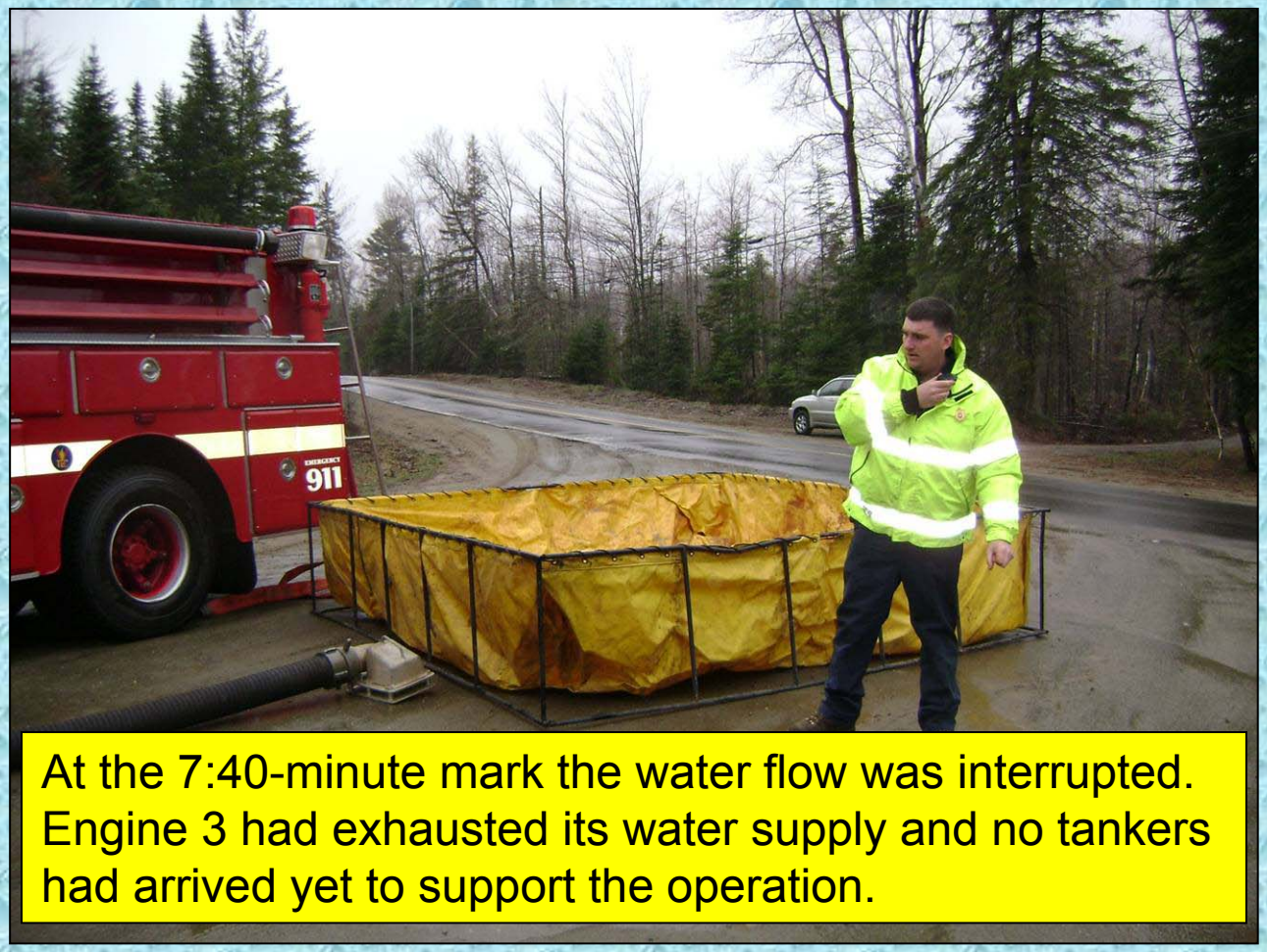
Dump Site Set-up

The crew works to prepare Engine 3 for drafting out of the tank. Here, a crew member connects a low-level strainer to the suction hose in preparation for placing the hose in the dump tank.

Dump Site Set-up

The crew gathers additional suction hose for the drafting operation.

Waiting on Water



At the 7:40-minute mark the water flow was interrupted. Engine 3 had exhausted its water supply and no tankers had arrived yet to support the operation.

Set-up Continues

Meanwhile, the crew continues to set-up the dump site while waiting on that first tanker to arrive.

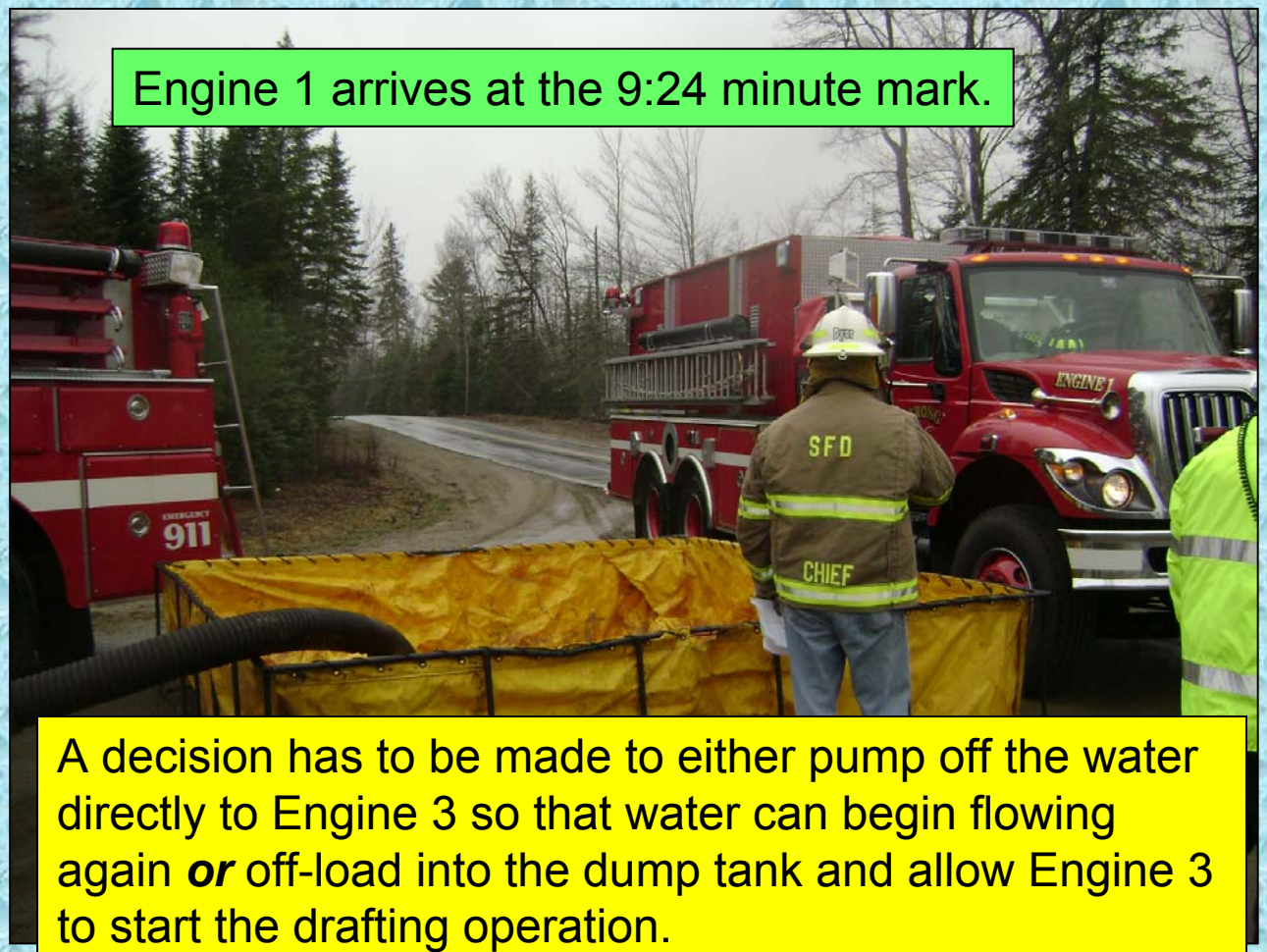
Water on the Way

The crew learns that water is on the way. Strong FD Engine 1 will soon arrive bringing its 2500 gallons to help out.

Dump Tank is Ready

The first dump tank is ready to receive water. The use of this low level strainer will allow maximum use of the water in the tank.

Strong Engine 1 Arrives



A decision has to be made to either pump off the water directly to Engine 3 so that water can begin flowing again ***or*** off-load into the dump tank and allow Engine 3 to start the drafting operation.

A Decision to Dump

Given that all flow had already stopped for a couple minutes, the decision was made to just dump and start the drafting process.

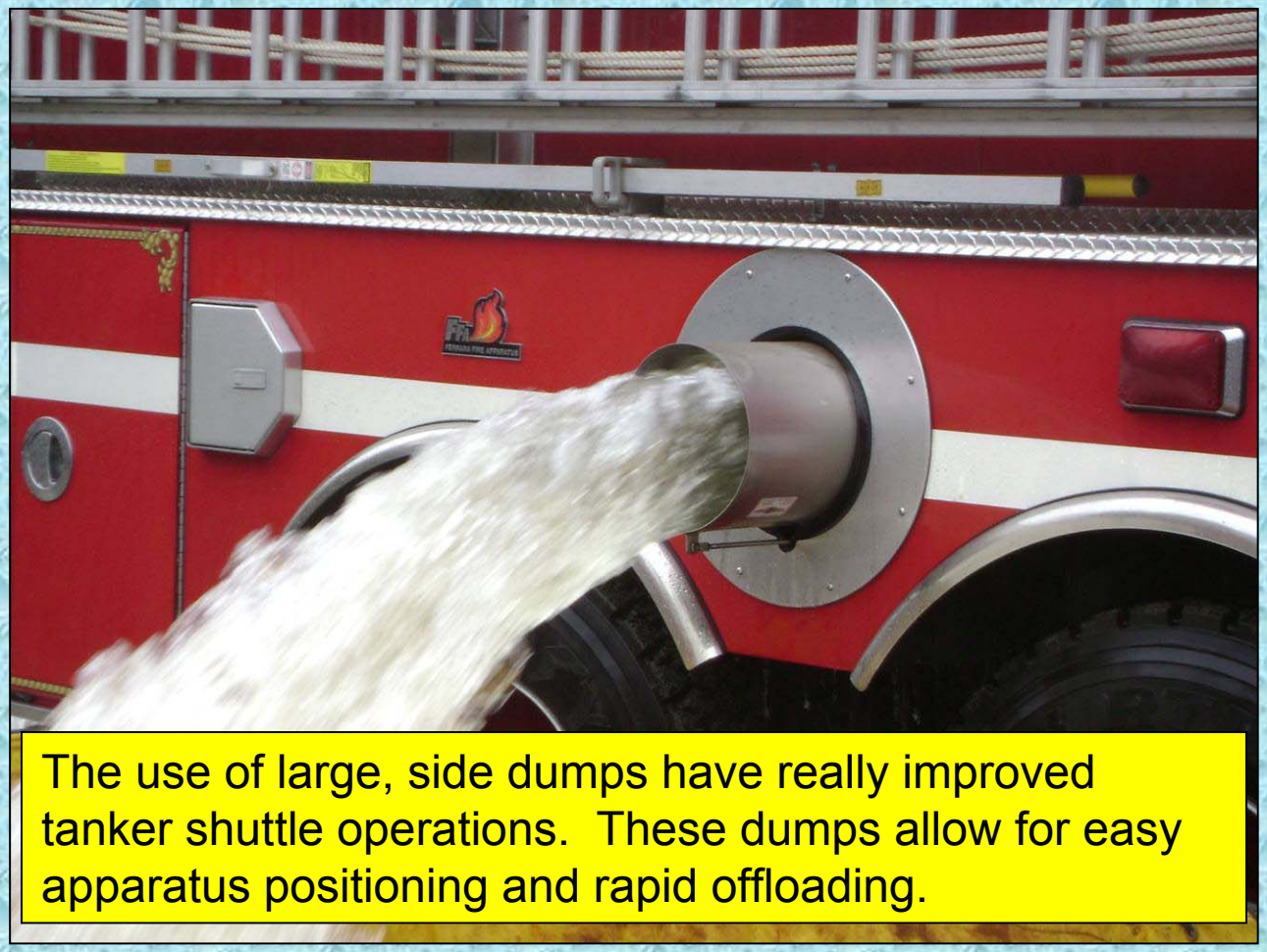
Strong Engine 1 Off-Loading

Strong Engine 1 offloads rapidly through its 10-inch side dump.

Tie Up Those Drains

While not a big issue here, this dump tank should have been stowed with its drain tied up tighter on the inside of the tank.

Side Dumps



The use of large, side dumps have really improved tanker shuttle operations. These dumps allow for easy apparatus positioning and rapid offloading.

More Water Arrives

Strong Tanker 5 arrives and is directed by the Dump Site Leader, Captain Jeff Hargreaves (New Vineyard FD). However, the flow to the Blitzfire is still absent because Engine 3 is having difficulty obtaining a draft.

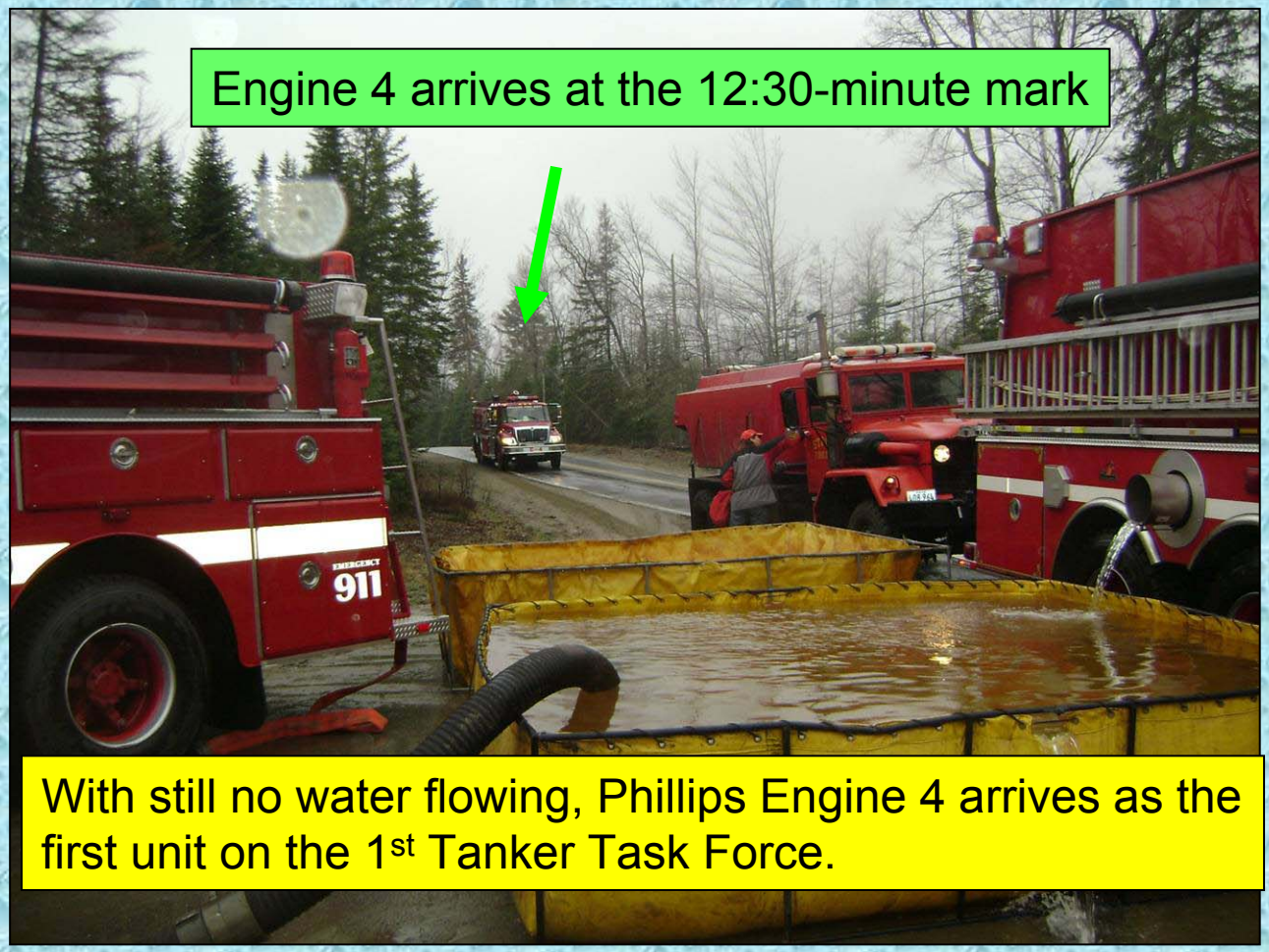
Murphy's Law

Strong Engine 3 just can't seem to get a prime. The crew works to troubleshoot – but without success. The tank is empty and there is an air leak in the suction hose connection.

More Dump Tanks

Meanwhile, additional dump tanks are set-up. Here, a 2,500-gallon tank is taken off of Tanker 5.

1st Tanker Task Force Arrives



Another Dump Tank

A third dump tank (3,000 gallon) is being prepared for set-up as additional tankers arrive.

Rear Dump Set-up

In order to better handle the rear-dumping only tankers, the 2500-gallon dump tank is relocated to the northern end of the dump site and set-up in a diamond shape.

Strong Tanker 5 Ready to Dump

The diamond set-up of the dump tank makes it easier for the rear dumping tankers to position without blocking the entire road.

Preparing to Pump

Still having drafting issues with Strong Engine 3, Phillips Engine 4 is directed to pump directly to Engine 3 in order to get water flowing again.

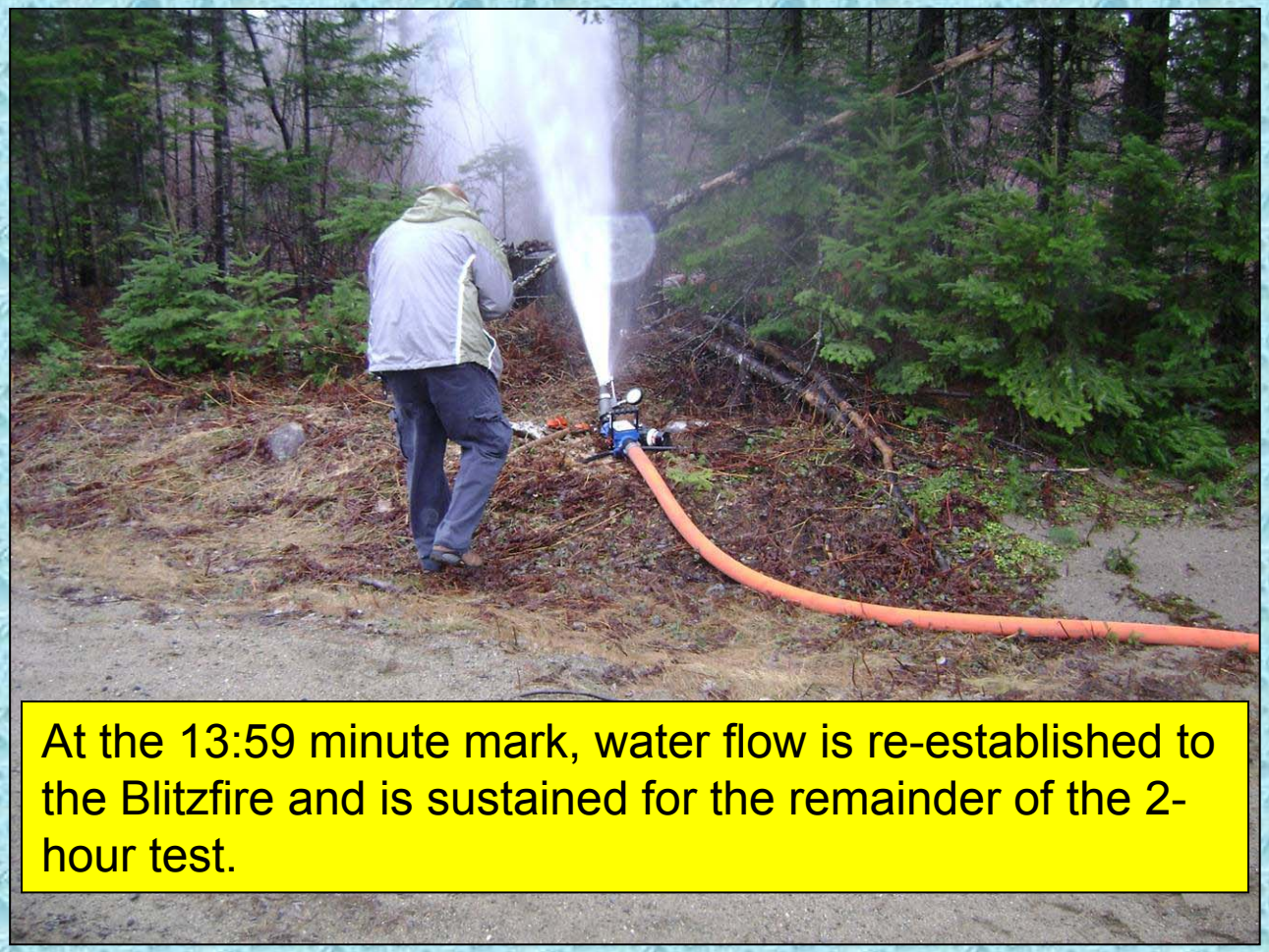
Temple Engine 3 Arrives

Temple Engine 3 (3,000-gallon) arrives as part of the 1st Tanker Task Force.

Phillips Engine 4
Gets into Position To Pump

Phillips Engine 4 prepares to pump to Strong Engine 3 in order to get the water flowing once again to the Blitzfire.

Water Flows Again

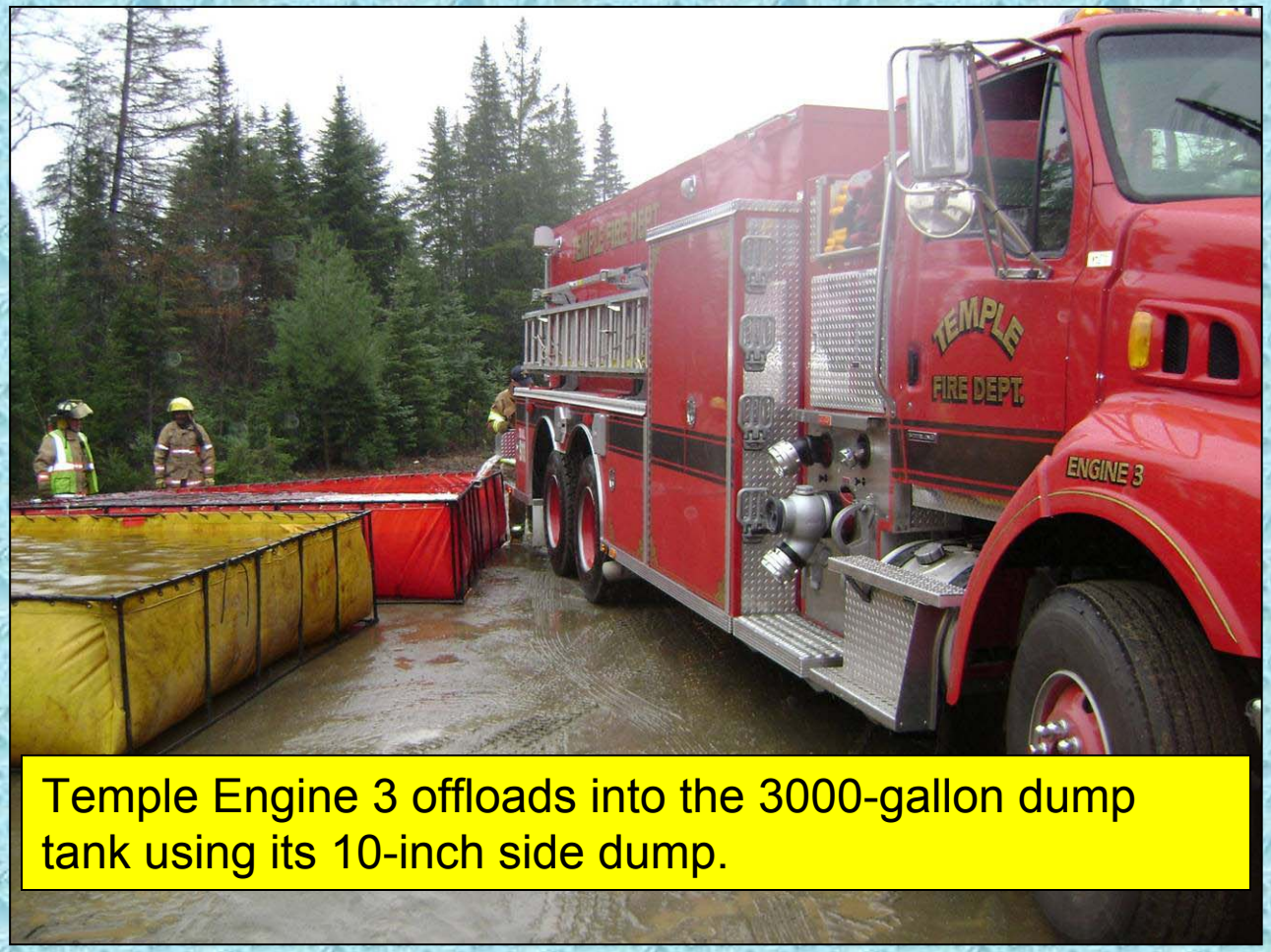


At the 13:59 minute mark, water flow is re-established to the Blitzfire and is sustained for the remainder of the 2-hour test.

Tanker 5 Offloads

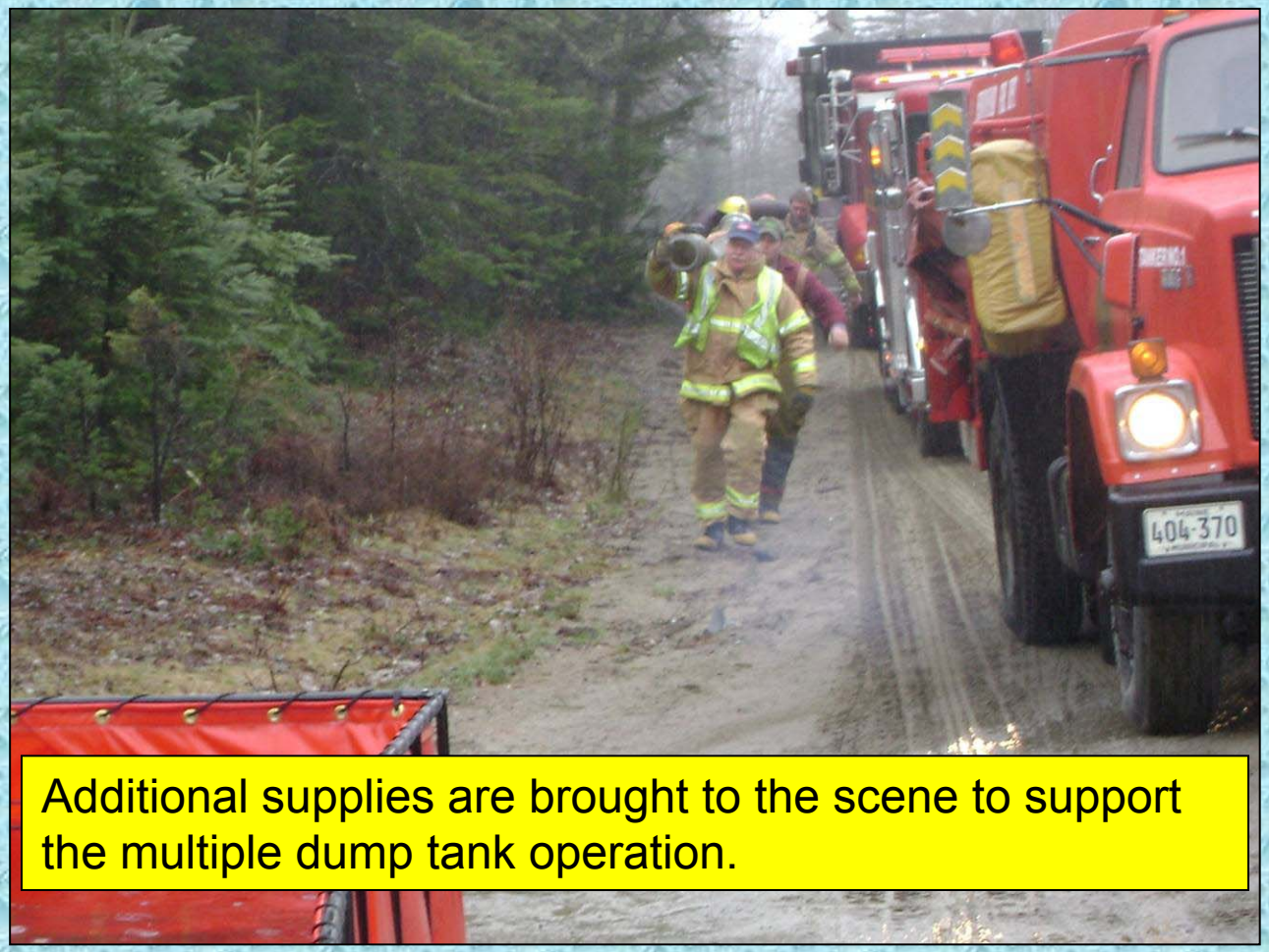
Strong Tanker 5 offloads using its rear 10-inch dump.

Temple Engine 3 Offloads



Temple Engine 3 offloads into the 3000-gallon dump tank using its 10-inch side dump.

More Supplies Arrive



Additional supplies are brought to the scene to support the multiple dump tank operation.

New Vineyard Tanker 1 Arrives

New Vineyard Tanker 1 arrives as the third tanker on the 1st Tanker Task Force

Backing Into Position to Offload

New Vineyard Tanker 1 backs into position at the diamond tank.

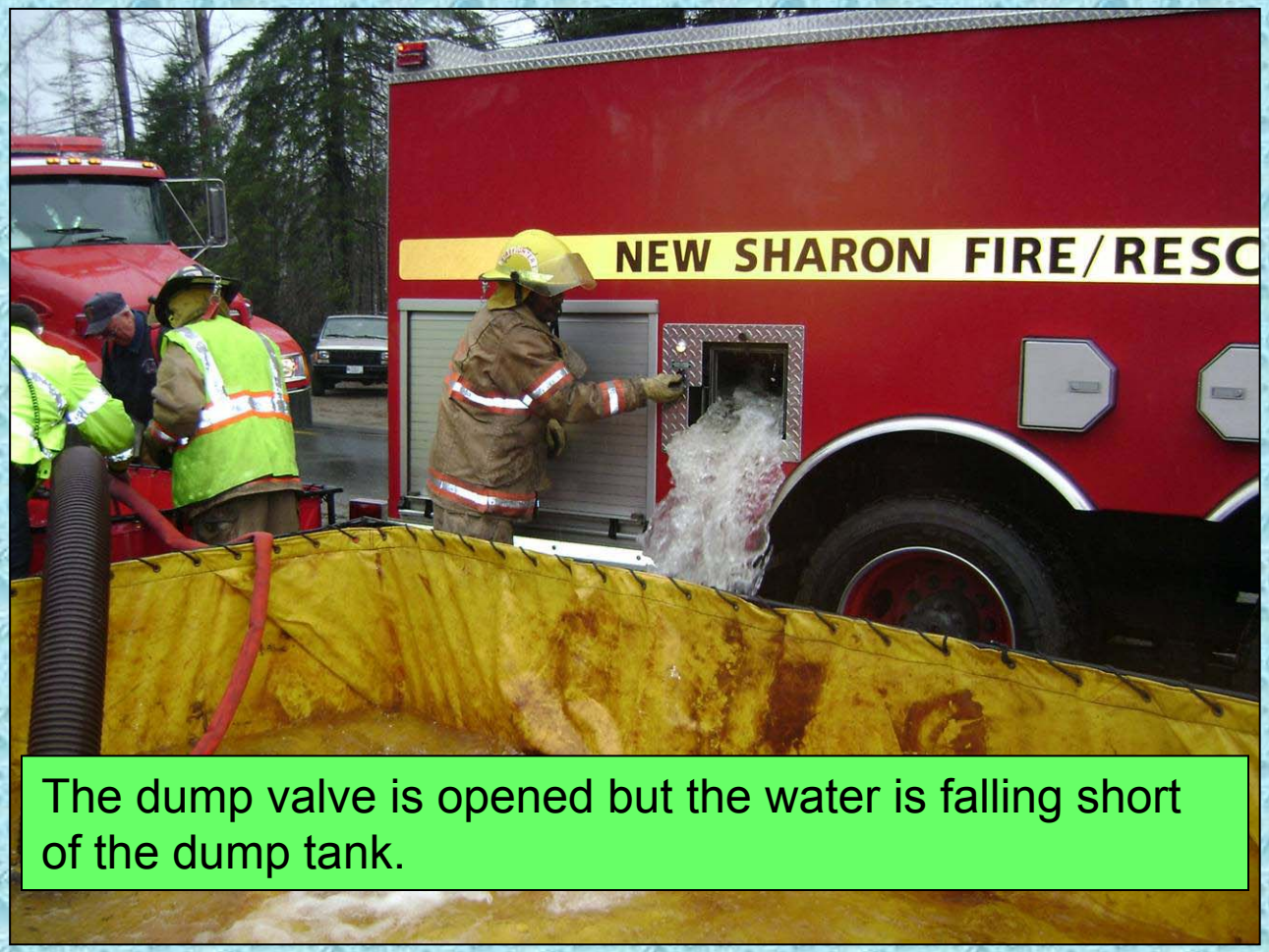
Phillips Engine 4 Drafts

Phillips Engine 4 takes suction (red strainer) from the original dump tank and pumps to Strong Engine 3 which in turn supports the Blitzfire. The crews did a great job of overcoming the drafting problem with Engine 3.

Jet Siphon Placed in Service

As New Sharon Tanker 1 arrives, the first jet siphon is placed into service.

New Sharon Tanker 1 Dumps

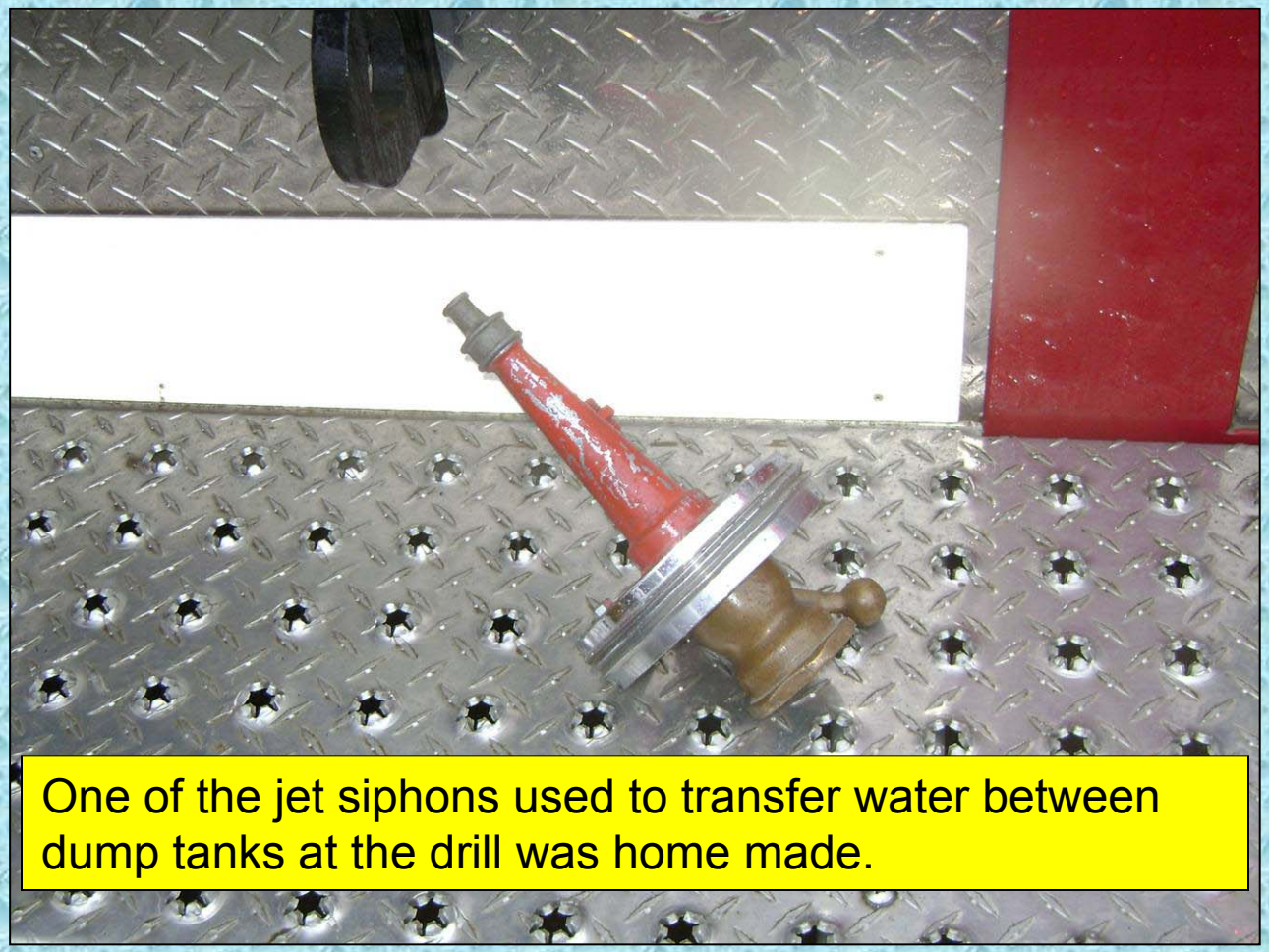


The dump valve is opened but the water is falling short of the dump tank.

Dump Chute is Extended

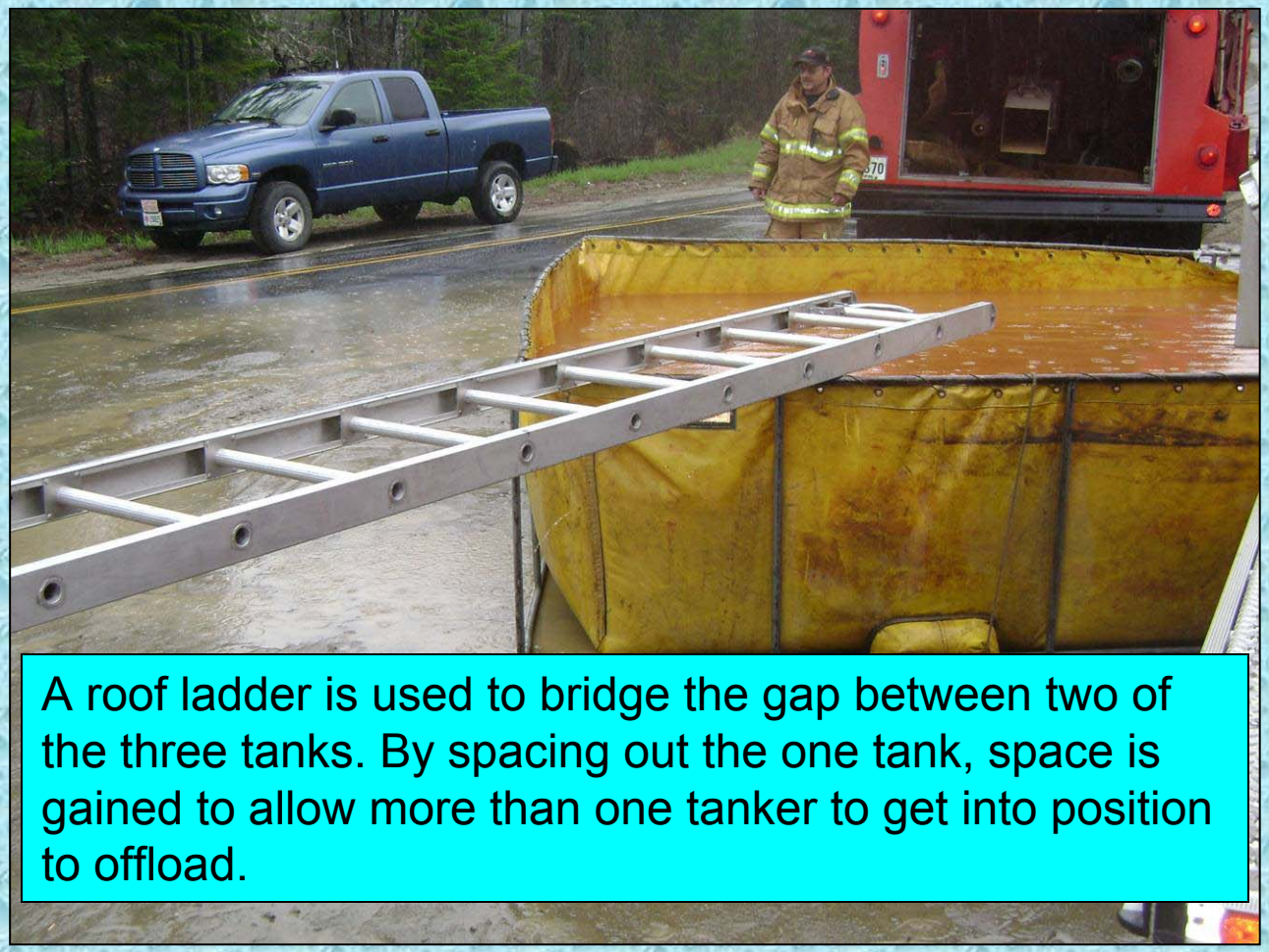
With a little guidance from the driver, the manual dump chute is extended and water easily reaches the tank.

Home Made Jet Siphon



One of the jet siphons used to transfer water between dump tanks at the drill was home made.

Making Room for Tankers



A roof ladder is used to bridge the gap between two of the three tanks. By spacing out the one tank, space is gained to allow more than one tanker to get into position to offload.

Eustis Tanker 5 Arrives

Eustis Tanker 5, the last tanker on the first Tanker Task Force arrives and gets into position to offload. Note the excellent stream of water coming from the jet siphon.

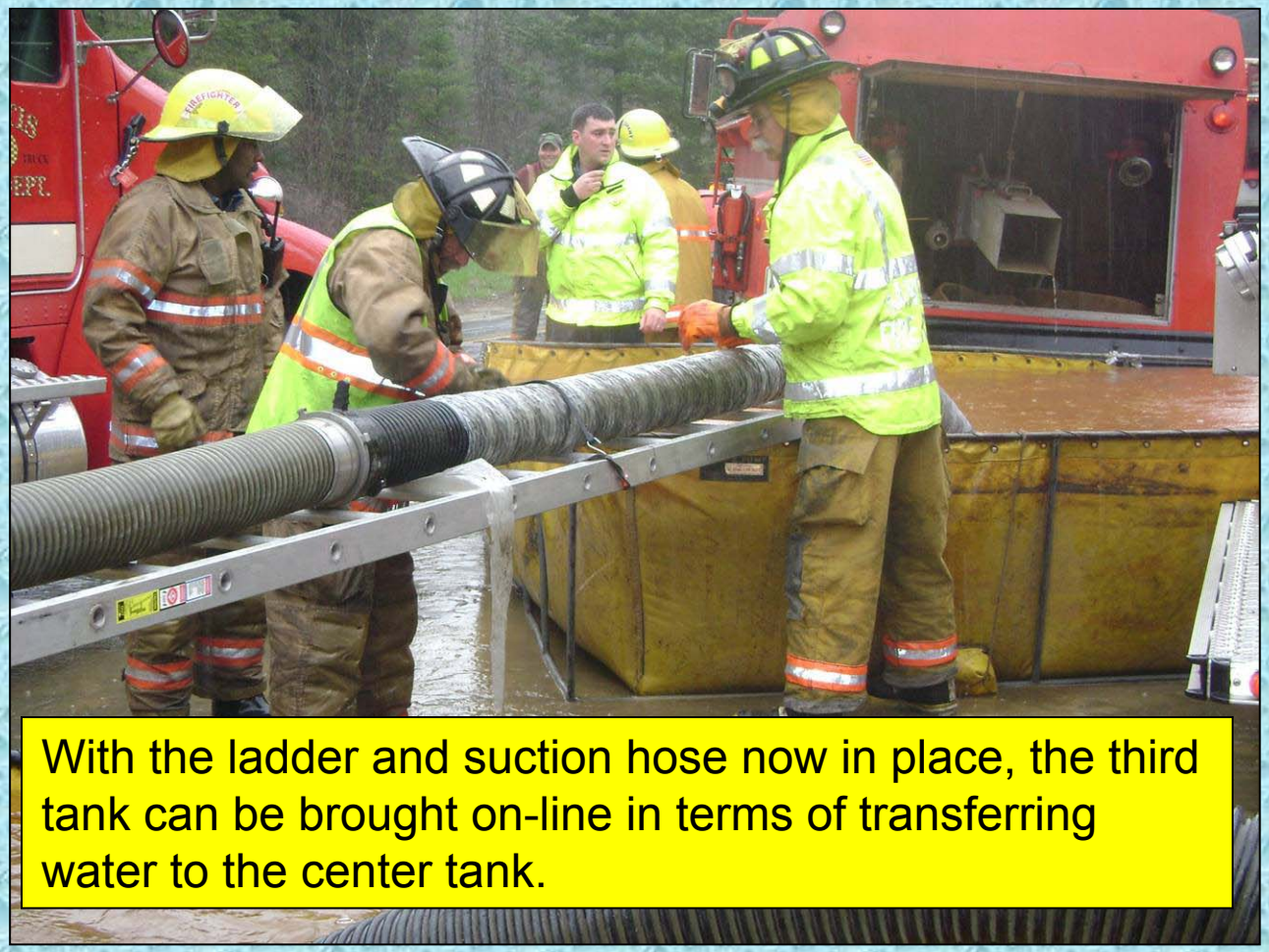
Eustis Tanker 5 Offloads

Another fast-dumping tanker using a 10-inch side dump.

Jet Siphon in Use

Another one of the home made jet siphons in use on a 6-inch suction hose.

Crews Ready Another Jet Siphon



With the ladder and suction hose now in place, the third tank can be brought on-line in terms of transferring water to the center tank.

New Vineyard Tanker 1
Ready To Dump

This converted fuel truck has a 10-inch dump which allows it to quickly offload.

Dump Tank Spacing

- The folks at this drill did a good job of getting some space between dump tanks. This space creates a “safe haven” for crew members to stand when a tanker arrives.
- The space also provides access to the equipment being used in the tanks.

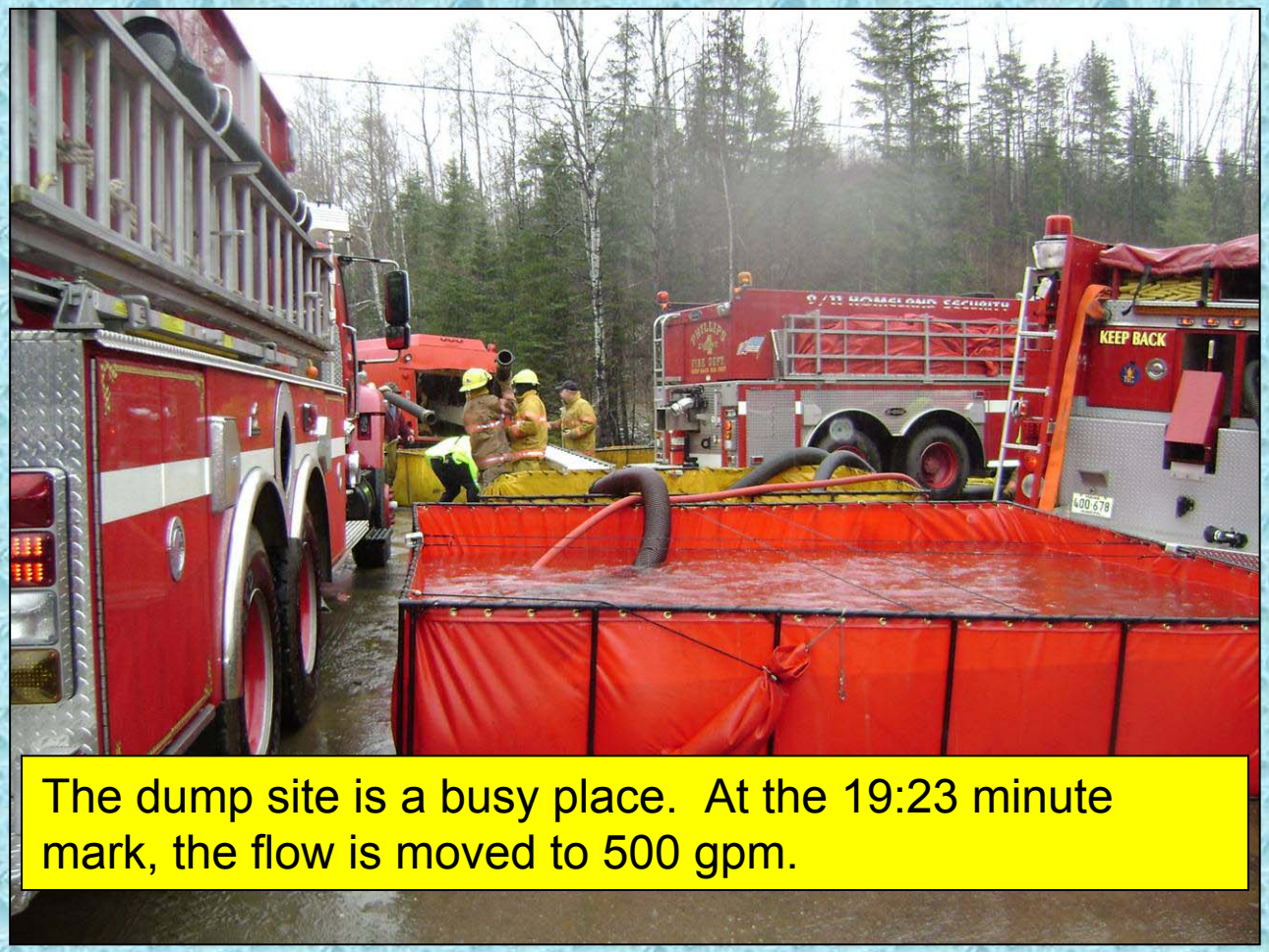
Another Excellent Stream

Shown here is the type of stream that should be seen from every jet siphon.

Plenty of Space

This dump site has been set up to utilize the available space. The use of the ladder certainly improves this space.

A Busy Place

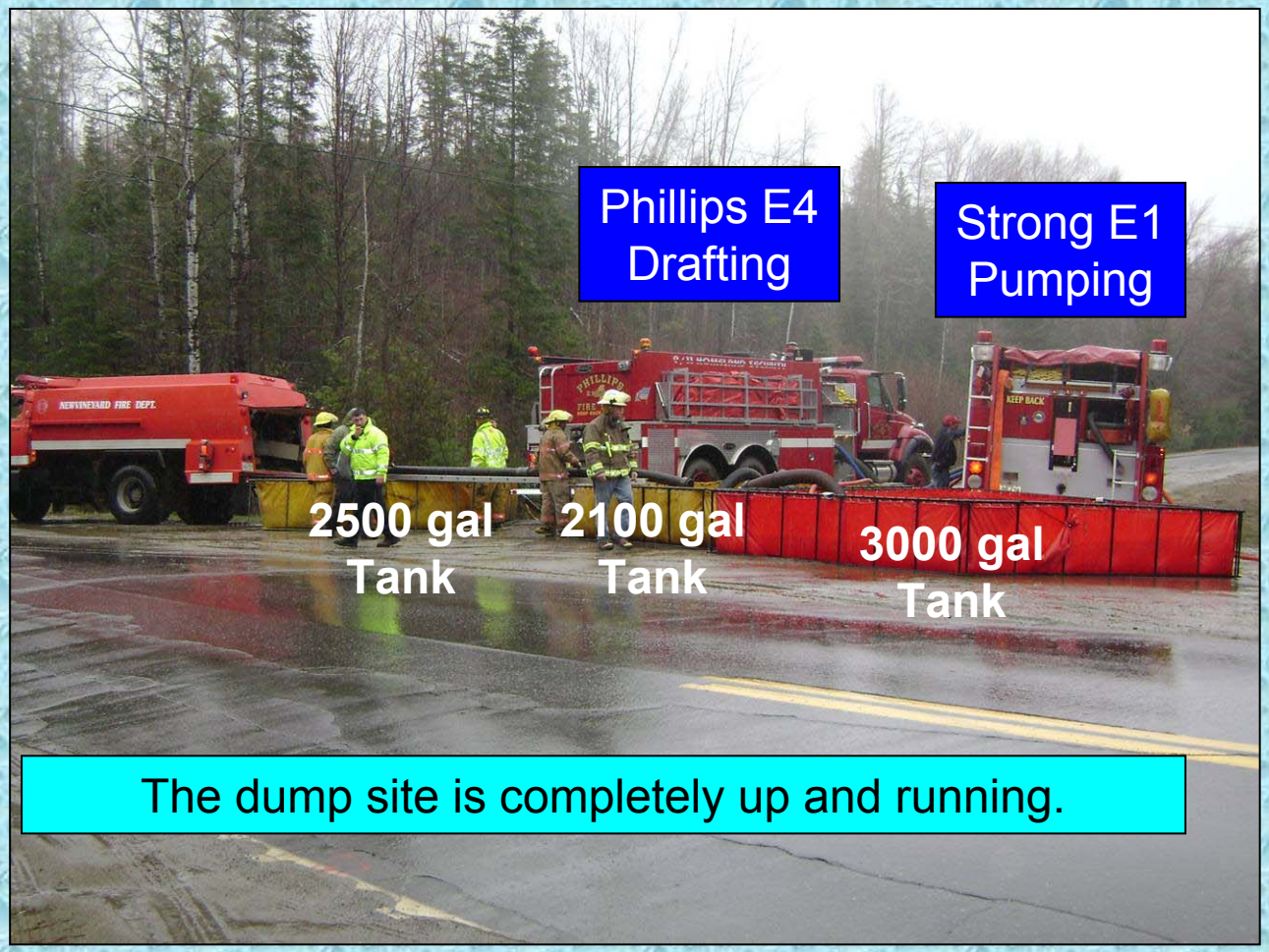


The dump site is a busy place. At the 19:23 minute mark, the flow is moved to 500 gpm.

1st Tanker Returns

At the 31:00 minute mark, the first tanker, Strong Engine 1 has returned from the fill site and is ready to offload its water.

The Dump Site Layout



Strong Tanker 5 Returns

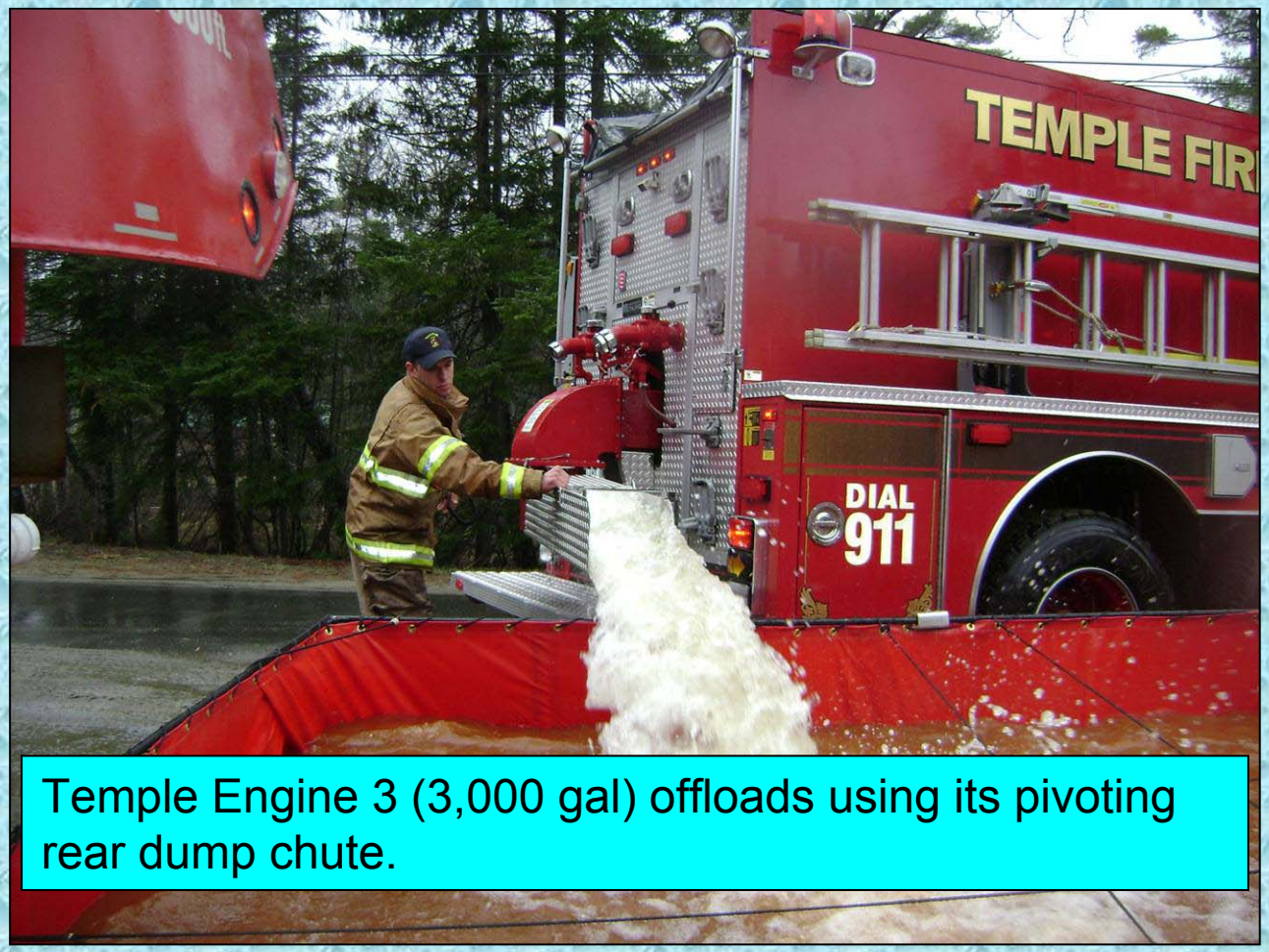
Strong Tanker 5 is the second tanker to return from the fill site. It returns at the 36-minute mark and positions to offload its water.

Tanker 5 Offloading

All Hands Working

With the dump site fully operational, additional personnel are added to help run the operation.

Temple Engine 3 Returns



Temple Engine 3 (3,000 gal) offloads using its pivoting rear dump chute.

Pivoting Dump Chute

The pivoting dump chute on Temple Engine 3 provides flexibility in offloading.

Additional Tankers Arrive

Additional Tanker Task Forces are requested and the units stage upon their arrival until instructed to dump.

New Sharon Tanker Returns

Back from the fill-site, New Sharon Tanker 1 prepares to offload its water.

Kingfield Tanker 3
Positions to Offload

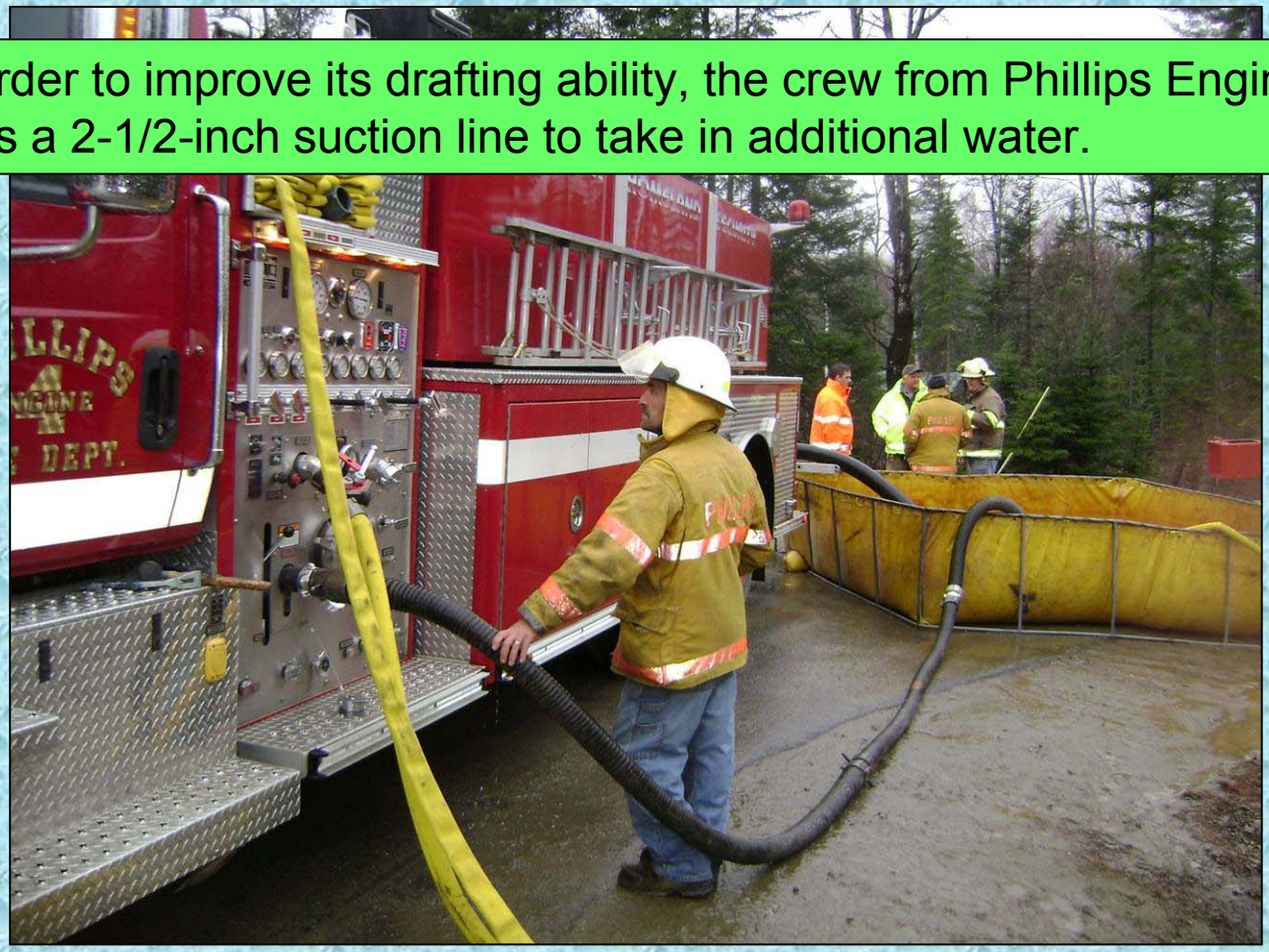
Kingfield Tanker 3 (2500-gal) moves into position to offload through its rear 10-inch dump.

Rangeley Tank 2
Positions to Offload

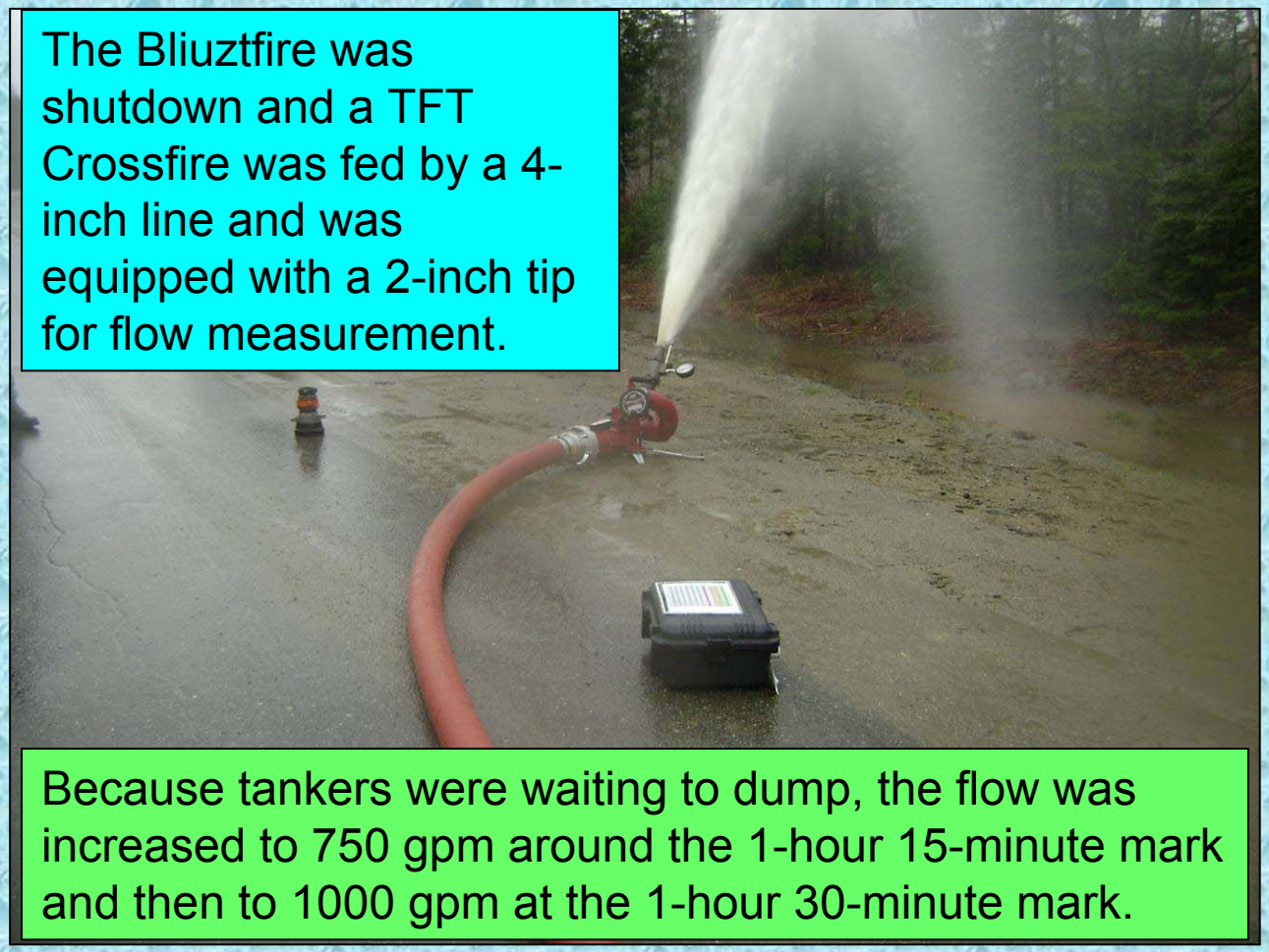
Meanwhile, on the other end of the dump site, Rangeley Tank 2 (2000-gal) backs into position to offload through its 8-inch rear dump.

Phillips Engine 4 Adds Suction

In order to improve its drafting ability, the crew from Phillips Engine 4 adds a 2-1/2-inch suction line to take in additional water.



Flow is Increased



The Bliuztfire was shutdown and a TFT Crossfire was fed by a 4-inch line and was equipped with a 2-inch tip for flow measurement.

Because tankers were waiting to dump, the flow was increased to 750 gpm around the 1-hour 15-minute mark and then to 1000 gpm at the 1-hour 30-minute mark.

Portable Pump Added

- When the 1000 gpm flow was started, a portable pump was put into operation to run the jet siphon a this tank.
- This helped Phillips Engine 4 because that engine was only a 1000 gpm pumper and pump capacity was becoming an issue.
- Running jet siphons uses up pump capacity – so the quick thinking of the crew who put the portable pump into service made the 1000 gpm flow obtainable.

Phillips Engine 2 Offloads

Phillips Engine 2 (1250-gal) offloads using its 10-inch rear dump.

Dump Site Layout

This photo shows the dump site looking back from the Crossfire portable monitor. The site basically consumes the entire intersection.

The Fill Sites

- Three fill sites were initially identified for the drill; a fire hydrant and two streams.
- One of the streams was to be accessed via drafting off a bridge – however, due to a fire call, that site was never set-up during the drill.

Fill Site #1 – North Main Street Hydrant

Loader Position

This Farmington firefighter operates in the Loader position and operates the LDH manifold that controls the flow of water to the tanker.

Engine on the Hydrant

Fill Site #1 operated from a fire hydrant that had a good water supply. The goal in operating a fill site is to be able fill at a rate of 1000 gpm or better. Putting a pumper on the hydrant allows for maximum use of the available water. The 1500 gpm pumper used in this drill helped to guarantee a reliable flow to the LDH manifold.

LDH Manifold Set-up

By arranging the manifold in this manner, the 2-1/2-inch ports can be used to drain the pressure off of the fill line when it is being disconnected from the tanker.

Fill Site #1 Operations

East Dixfield Tanker 1 arrives at Fill Site #1 for filling.

Direct Fill Lines

With the 4-inch direct fill broken, crews adapt by running the 4-inch fill line to the 2-1/2-inch fill line. While not as efficient – it certainly works better than using 2-1-/2-inch hose.

Fill Site Staffing

Fill site staffing is very important. At a minimum, someone is needed to run the pumper, the LDH manifold, and make and break fill line connections.

Fill Two at a Time?

While two tankers can be connected to a fill site at the same time, the best practice is to only fill one at a time. That way all pumping resources are focused on one tanker.

Fill Site #2 – North Main Street Stream

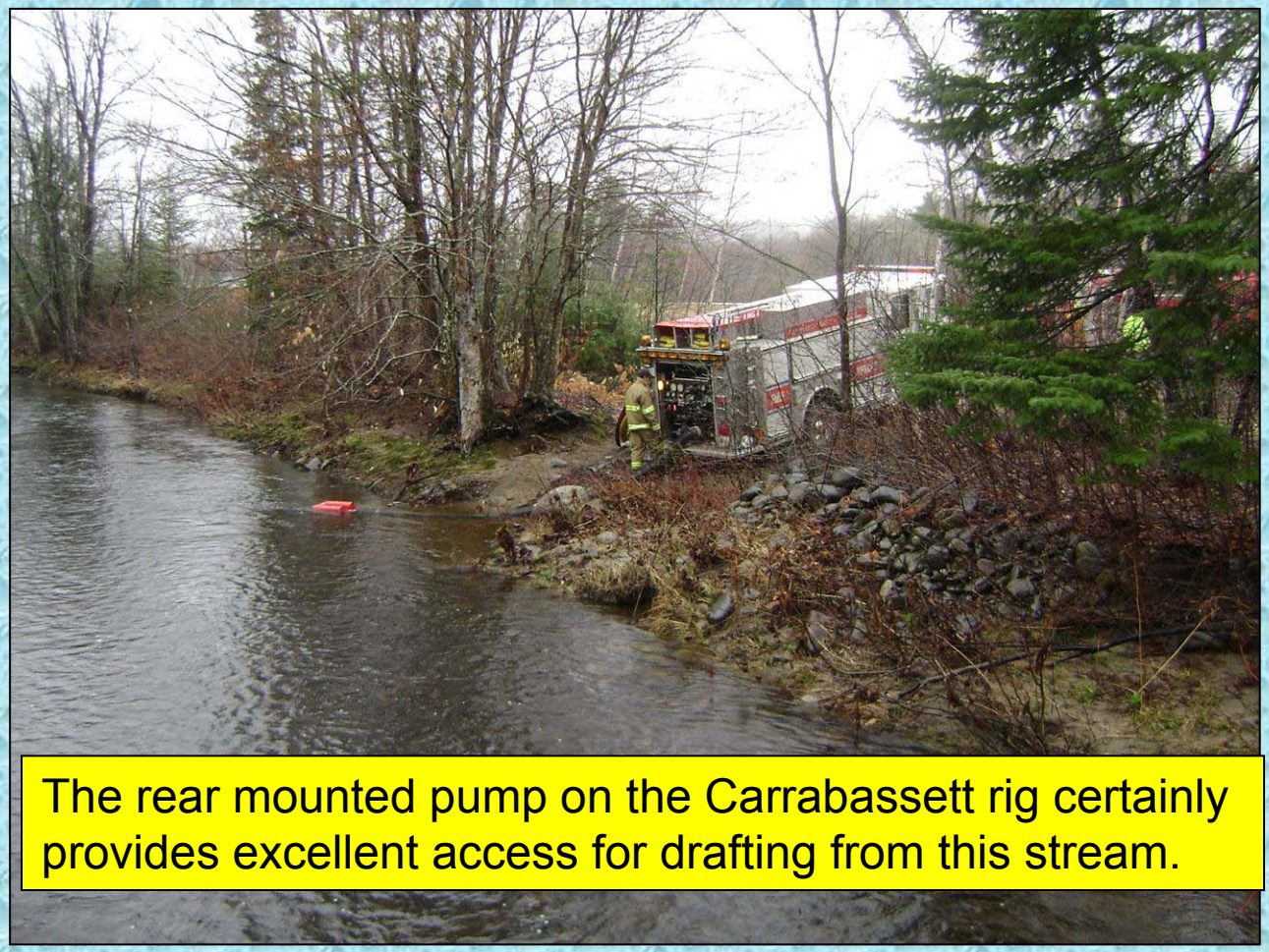
Fill Site #2

- This fill site used the pumper to draft and then supply a gated-wye device for filling tankers.
- The gated wye serves the same purpose as the LDH manifold in that it allows someone other than the pump operator to control filling the tankers.

Fill Site Adaptors

Adaptors become an issue as do threaded connections at a fill site. The connection shown above could be sped up by using 2-1/2-inch Storz adaptors.

Fill Site Access



The rear mounted pump on the Carrabassett rig certainly provides excellent access for drafting from this stream.

Floating Strainer

Note the floating strainer being used. There was concern over sucking up stream bottom silt – so the floating strainer was used.

The Results

- The drill concluded after 120-minutes of operation.
- Water flow was only interrupted once at the 7:40 minute mark but the interruption lasted for about 7-minutes.
- The interruption occurred after the first engine ran out of water and could not obtain a draft due to a leaking gasket issue and an empty water tank.
- A total of 86,100 gallons were moved during the 2-hour event resulting in an average flow of 717.5 gpm.

Lessons Learned

- Many people and water transport rigs were used to deliver the 700+ gpm for the duration of the drill – emphasizing the need to call for help early in an incident.
- When setting up a dump site, it is important to support the fire attack by pumping water to attack engine while the dump tanks are set up.
- 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.

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.

Lessons Learned

- Grouping resources into Tanker Task Forces or other similar clusters, improves the ability for the incident commander to request water supply assistance in large “chunks”.
- Threaded connections slow down fill site operations – consider using Storz-style fittings.

Summary

- The drill was a success. It showed the value of grouping resources together and the value of interoperability.
- All of the crews worked very well together and all of the apparatus proved quite capable of delivering water.
- Many thanks to the Franklin County Fireman's Association for sponsoring the program and to all of the fire departments who provided support to the seminar.

www.GotBigWater.com