West Central Ohio EMA Region 3

Alternative Water Supply Drill Summary

Russia, Ohio - Spring 2022

On Sunday, March 20, 2022, the Shelby County Firefighters' Association and the Russia Community Fire Company hosted a water supply exercise for OH EMA Region 3 with assistance from the Ohio Fire Chiefs' Water Supply Technical Advisory Committee (OFCA WSTAC). The objectives of the exercise were:

1- Building resiliency and interoperability by incorporating engines, conventional and vacuum tanker (tender) apparatus, and an aerial platform from several counties across the 8-county region for a high-volume water shuttle simulating an unusual fire incident where alternative water supply is called upon
2- Evaluating the existing standardized connections for rapid tanker filling
3- Consideration of the "Tanker Task Force" resource deployment model
4- Integration of an industrial fire pump system with a drafting fire engine for high-volume tanker filling utilizing a dual-pump LDH shared supply
5- Coordination of multiple dump / drafting sites to support a second dual-pump fire attack site supplying a 2,000-gpm tower ladder
6- Identification and mitigation of failure points or "bottle necks" in a rural water delivery system

At the conclusion of the exercise, a maximum flow rate of 2,250 gpm was achieved to the simulated fire attack apparatus. This was accomplished with three (3) engines at the fill site, and four (4) engine companies at the dump site. Twelve (12) total tanker apparatus were in the rotation with nominal capacities from 1,800-3,000 gallons and an average ISO rating capacity of 2,062 gallons. Three (3) of these mobile water supply apparatuses were vacuum tankers, the remaining nine (9) were conventional gravity tankers. Water flow started at 500 gpm at 9:15am and concluded at 12:15pm with an average flow rate of 1,375 gpm throughout that time.

Water supply to the fill site consisted of a fire hydrant fed with pond water from a 1,500-gpm fixed fire pump, through 600 feet of 5" LDH to Osgood Engine 1441. Simultaneously, Lockington Engine 763 took a dual suction draft from the same static source pond and supplied Russia Engine 1061 with 700 feet of 5" LDH. Engines 1441 and 1061 were then connected in a dual pump or looped supply by a third 200 foot 5" LDH connection. Engine 763 maintained 75psi pump discharge pressure (PDP) throughout the exercise and could have easily increased the total capacity with a higher PDP if needed. Engines 1441 and 1061 maintained 30-40psi intake pressure at peak flow.

Lockington Engine 763 drafts water from the pond, the fire pump building is visible to the right. Sidney's Quint 3, at the business end of the water shuttle, sends the water back to the pond after a short but frenzied trip down the road.

Initially the fire hydrant supplied Engine 1441 with 150psi which required gating back discharges until flow was established. Once flowing, friction loss in the system kept all pressures easily manageable. Also, caution must be exercised in mixing a hydrant supply with a drafting engine to prevent back-feeding water into a municipal system. In this case, the hydrant was directly supplied from the same static source as the pumper. Also, as noted, the drafting engine maintained their discharge pressure well below the static pressure of the fire hydrant.

In Shelby County, all tankers are equipped to receive water by direct tank fill via dual 65mm (2.5") storz connections. In neighboring Darke County, all tankers are standardized on 4" storz tank fill connections. The fill sites were prepared to fill tankers by either connection type, and all nine conventional tankers participating had at least one of these standardized fill connections. The rapid connection and disconnection of the storz adapters and the easier handling of the hoses smaller than 5" LDH resulted in very efficient tanker filling operations.

Tanker 751 from Burkettsville has both connections for 4" storz as well as 65mm.

At all fill sites, tankers were able to enter and exit the loading stations “pit style” without waiting on those ahead to get in or out of a space. There were four conventional loading stations and one vacuum loading station. At no point in the day did any tanker have to wait for a loading station to be available to fill. Over one hundred twenty (120) times tankers were quickly and safely loaded and sent to the dump site. Over the course of the exercise, the conventional tankers made 9 or 10 trips each, the vacuum tankers each made 12 of the five-mile round trips each.

Russia’s engine crew utilized manifolds supplied from the pumper to the loading stations. These offered the crew the option of filling with a single 4” storz connection, dual 65mm storz connections, or even in some cases a combination of 4” and 65mm as time and resources allowed.

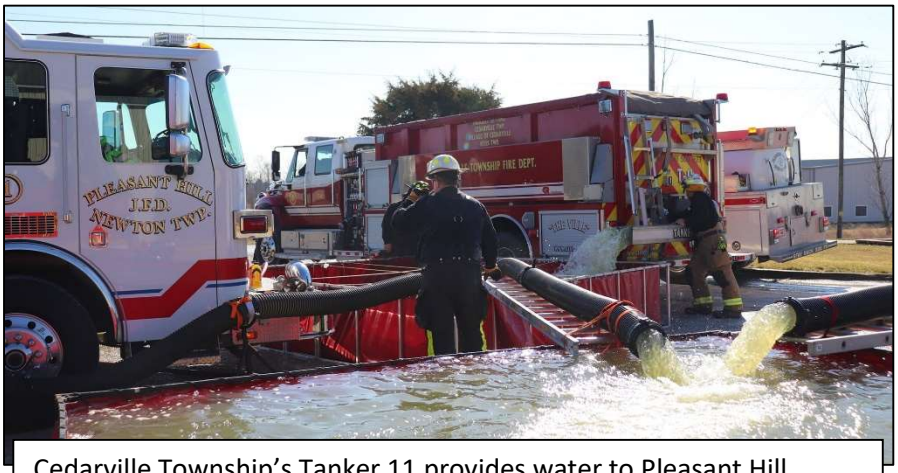
All three vacuum tankers were fitted with 6” camlock / cam and groove fittings for self-filling with 6” suction hose. Additional supply water from 763 and the fire hydrant was utilized to fill a dump tank; Osgood’s engine crew was responsible for maintaining that tank level as full. One firefighter was assigned at the vacuum tanker fill site to assist in making suction connections to the tankers.

The vacuum tankers were able to seamlessly integrate with the gravity apparatuses, and due to the availability of a self-loading station, their efficiency was able to be maximized. Accounting for tank size, in gallons delivered, the vacuum apparatuses delivered 23% more water per truck on average than the conventional tankers across the entire exercise. By utilizing only one person at the self-loading station, the vacuum tankers delivered their water, gallon for gallon, with about half the needed personnel required for the other nine tankers.

Bradford’s Tanker 55 draws a load of water at the vacuum tanker self-loading station.

The five-mile shuttle route, starting at the fill site, went almost immediately to the dump site in a separate area within the same complex. After departing from the dump site, tankers drove around a simple road course. This route consisted of generally straight and flat, although narrow, rural roads. Four left turns brought the tankers back to the fill site again.

At the dump location, tankers were able to discharge their water into any one of several dump tanks. Houston Engine 461 took dual suction from two of these tanks, supported by Maplewood Engine 863 for assistance with running jet-siphon water transfer devices. Engine 461 supplied 500 feet of 5" LDH to Sidney Quint 3, a 2,000-gpm tower ladder. Fort Loramie Engine 361 also took direct suction from the dump tanks with jet siphon support from Pleasant Hill Engine 65. Engine 361 supplied 400 feet of 5" LDH to Quint 3's second main pump intake. All tankers participating were capable of discharging their water at over 1,000 gpm to the left, right, or rear as needed. Backing tankers was avoided to the extent possible.



Cedarville Township's Tanker 11 provides water to Pleasant Hill Engine 65. The crew with Tanker 11 traveled over 60 miles from the far corner of the region to participate. The statewide radio system and their well-equipped apparatus meant they had no problems integrating with the operation. Fort Loramie's Engine 361 is drafting from the tank in the foreground.

Two problems were encountered and overcome at the receiving end of the operation. The first was quickly resolved, the second took more time and effort. Early in the process of working together to supply the quint, Engine 361's crew realized they were not supplying water. This was indicated by noticing their dump tank water level was not decreasing. When the pump operators checked their pressures, it was noted that Engine 461 was discharging at 130psi while Engine 361 was discharging at 75psi PDP. That issue was resolved by Engine 461 simply reducing their discharge pressure to 75psi to match Engine 361. These two engines maintained this PDP throughout the exercise. Quint 3 maintained an intake pressure above 20psi throughout. Had the aerial company required additional assistance to achieve their desired PDP, 461 and 361 could have easily increased their PDP as needed.

It is worth noting that this imbalance was found and resolved utilizing the radio communications plan formed earlier in the day. Overall command and control and "Central Dispatch" communications were performed on the Ohio Multi-Agency Radio Communications System (MARCS) XECOMM channels assigned for the exercise. Fill site operations and dump site operations were conducted on individual simplex tactical channels utilized by the pump operators to allow them unrestricted and continuous voice contact.

The second problem to overcome at the dump site was found as the flow rate passed 1,000 gpm to 1,250 gpm. Each of the two supply engines had at least two dump tanks for tankers to discharge their water into. Unfortunately, these tanks were placed adjacent to one another which prevented multiple tankers from dumping at each site simultaneously. Only two total tankers could dump at any one time. As tankers generally dump at an average rate of 1,000 gpm, the time spent maneuvering trucks to and from the dump tanks meant that higher flow rates would not be achievable without the ability for more trucks to discharge their water at the same time. Experienced officers evaluated the layout of each dump site and made recommendations for remediation. While a flow of at least 1,000 gpm was maintained throughout, each site drained and moved one of their tanks. After moving the tanks, tanker trucks were able to dump four at a time; two at each site. The overall flow rate was then able to be raised through 1,250 to 1,500, 1,750, 2,000, and 2,250 gpm without issue.

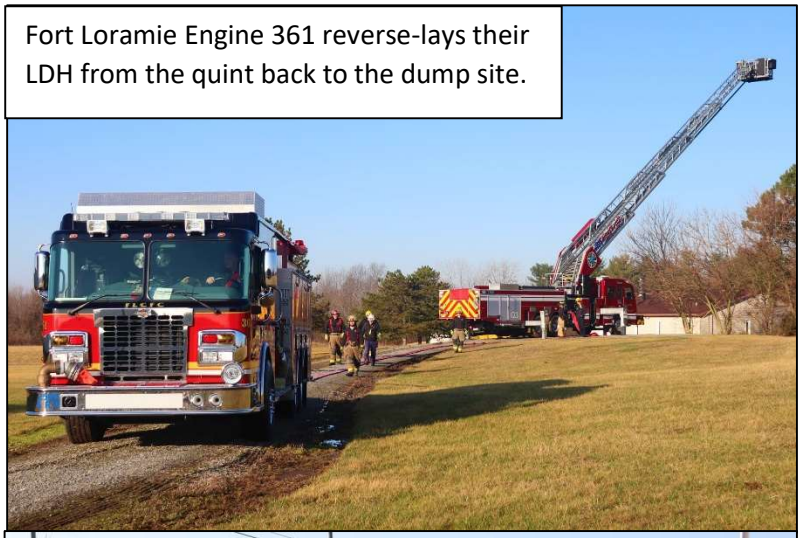
Fletcher Tanker 94 prepares to drop water for Houston Engine 461 and Maplewood Engine 863. The dump tank on the far right has been moved but has not been filled yet.

In the attainment of a flow rate of 2,250 gpm, of the engines at the fill site and those supplying water to the quint, only the quint needed to operate at greater than 75psi net PDP. The fill site engines were filling tankers at 100psi, but also receiving water at 30-40psi. Several pump operators remarked how calm the operation was from their perspective. The tanker drivers and the firefighters connecting hoses to the tankers at the fill site however were substantially more engaged during the height of the exercise.

This exercise showcased the importance of the special equipment, techniques, training, standardization, and communications required to achieve water flow rates greater than those required for "bread and butter" residential firefighting. In this drill, most of the apparatuses were already built and equipped to be best prepared for alternative water supply operations. Even still, we utilized several adapters, valves, manifolds, and suction hose made available by members of the OFCA WSTAC. A similar cache of equipment with regularly needed items could prove pivotal to large-scale operations.

When big water is required, and a well-supplied municipal system is not available, smart and aggressive responders have other options, but only through coordination and pre-planning can those resources be brought to bear. Many thanks are in order to all the dozens of firefighters and officers who gave up their Sunday morning to practice water delivery skills with others from around west central Ohio. With continued dedication, we will surely build upon our past accomplishments. Fire officers in Ohio who would like to host water supply training should reach out to the OH WSTAC through the Ohio Fire Chiefs' Association.

Fort Loramie Engine 361 reverse-lays their LDH from the quint back to the dump site.



Several thousand feet of hose went on the ground for this exercise. Every section had a purpose and every one was used. Managing lines was a key to success.

Conventional Tankers:

Arcanum 351 - 1,800 gallons

Burkettsville 751 – 2,000 gallons

Cedarville Twp 11 – 3,000 gallons

Covington 52 – 2,000 gallons

Fletcher 94 – 2,000 gallons

Houston 464 – 1,800 gallons

Osgood 1451 – 3,000 gallons

Russia 1063 – 2,500 gallons

Versailles 1951 – 2,500 gallons

Vacuum Tankers:

Bradford 55 – 2,000 gallons

Lockington 762 – 2,000 gallons

Pleasant Hill 65 – 2,200 gallons

General Exercise Layout - March 20, 2022 – 3880 Rangeline Rd., Russia, OH (Not to scale)