



Turbo Draft Flow Tests

Marion County, Kansas
April 18, 2010

Overview

- On April 17th and 18th 2010, GBW Associates, LLC conducted a Rural Water Supply Operations Seminar hosted by the Marion County (Kansas) Fire District #5.
- Part of the seminar included a review of drafting operations and the use of a Turbo Draft device to access water that a pumper may not be able to access.
- One department in attendance wanted to know the flow capability of the Turbo Draft and since another department in attendance had just acquired a Turbo Draft via a grant – the stage was set to conduct a couple of tests.

The Process

- Three flow tests were conducted – one using the Turbo Draft to feed a portable monitor, one using the Turbo Draft to fill a 3,000 gallon portable dump tank, and one using the Turbo Draft to supply the source pumper and then discharge a master stream line.



Test Pumper



Lincolnvile Engine 1 – a 1,500 gpm pumper w/1,000 gallon tank was used to support each flow test.

Flow Test #1 : The Set-Up



Not fully deployed yet in this photo.

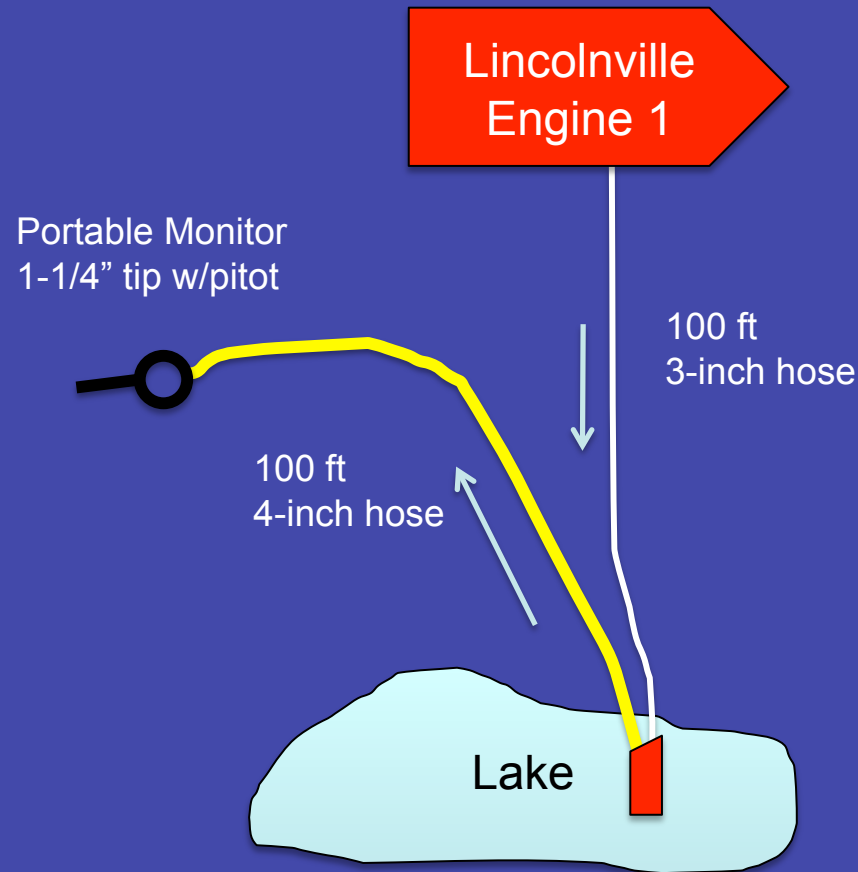
The Turbo Draft was submersed in about 2-feet of water and rested on the lake's rocky bottom.

Flow Test #1 : The Set-Up



This test attempted to measure the Turbo Draft's flow potential when being fed by 3-inch hose. The objective was to measure the flow at the portable monitor.

Flow Test #1 : The Set-Up



Flow Test #1 : The Results

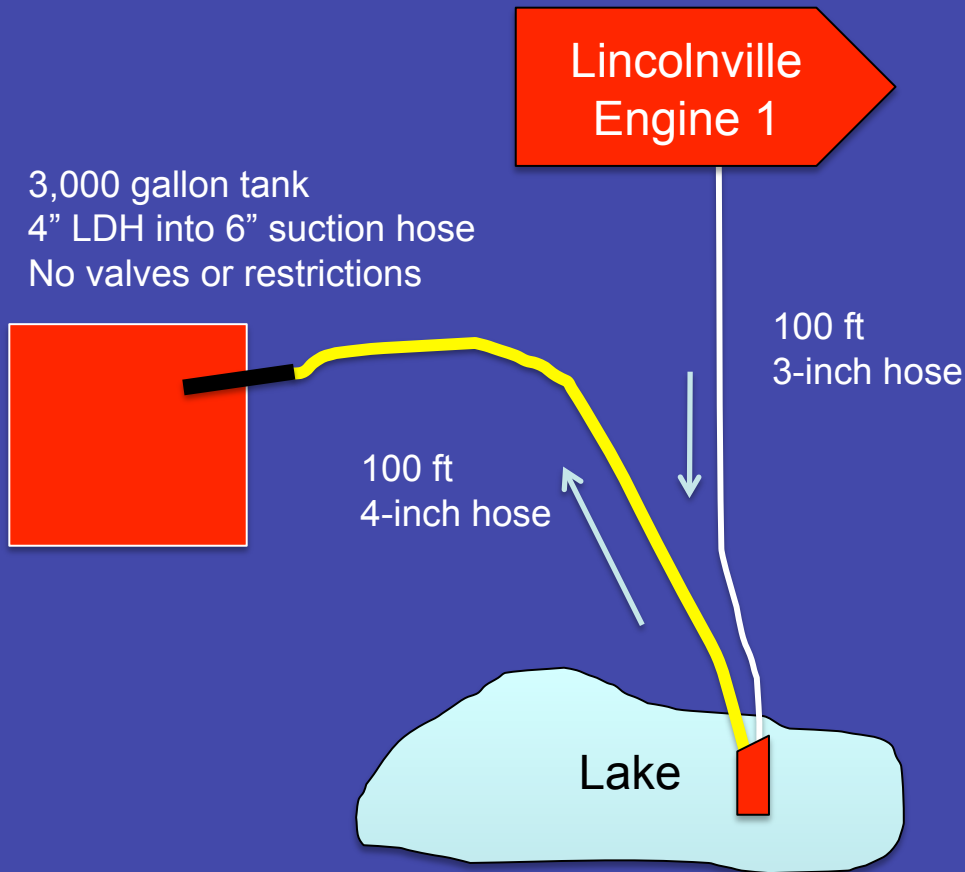
- This flow test produced poor results.
- With the pumper operating at a 200 psi discharge pressure, a pitot reading of 12 psi was obtained on the 1-1/4 inch tip thus equaling a flow of just 206 gpm.
- The problem was the test – Turbo Draft is not designed to provide high discharge pressure – it is a low pressure - high volume device. The test tried to make the device do something it is not designed to do.
- The smooth bore nozzle on the portable monitor required too high of a nozzle pressure for the Turbo Draft to function properly. So...it was on to Test #2!

Flow Test #2 : The Set-Up



While less scientific than Test #1, the goal with Test #2 was to see how fast the test set-up could fill a 3,000 gallon portable dump tank

Flow Test #2 : The Set-Up



Flow Test #2 : The Results



It was quickly apparent that the flow was much better with this type of set-up

Flow Test #2 : The Results



Time was started when the first drop of water entered the tank and was stopped when the tank overflowed.

Flow Test #2 : The Results

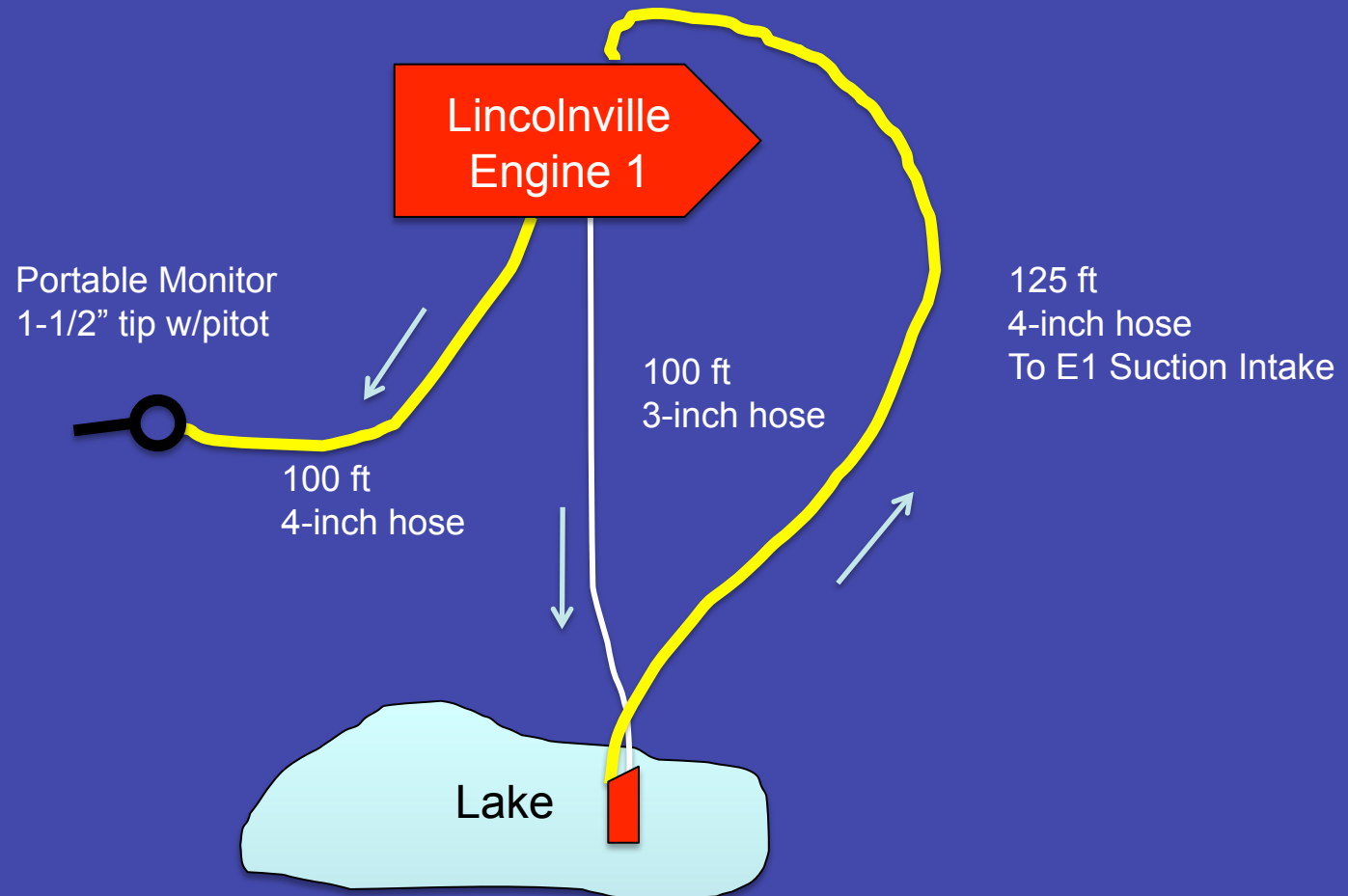
- The results of this test were much better.
- With a 200 psi pump discharge pressure, the 3,000-gallon tank was filled in 4:15 minutes – for an approximate flow rate of 705 gpm.
- However, it must be noted that Engine 1 just about exhausted its onboard tank – so in effect – Engine 1 used 1,000 gallons of water to provide 2,000 gallons for a total of 3,000 gallons in the tank. Not bad!
- While Test #2 was least accurate (no pitot devices) – it appeared to show a real practical use of the device.

Flow Test #3 : The Set-Up



A portable monitor was once again used – but this time it received its water from the pumper.

Flow Test #3 : The Set-Up



Flow Test #3 : The Results



With Turbo Draft feeding the pumper, the portable monitor produced an effective fire stream.

Flow Test #3 – The Results

- With a pump discharge pressure of 200 psi to the Turbo Draft, a pitot reading of 110 psi was obtained at the portable monitor – which meant a flow of 699 gpm.
- This flow test provided another good example of a use for the Turbo Draft device – although the 200 psi discharge pressure to the device might be tricky to maintain when pumping other lines – so knowledge and practice with the device would be important.
- It is also important to note that this approximate 700 gpm flow was really not the total flow of the pumper – since some water was being used to run the Turbo Draft. Therefore, the 700 gpm is the excess flow that was made available.

Summary

- It was clear that Turbo Draft was not designed to directly feed a fire stream – that was shown in Test #1.
- Both Test #2 and #3 showed real applications of the device and its flow capabilities using 100 feet of 3-inch and 100 feet hose.
- It was also apparent that while Turbo Draft is a simple device – operators must be well-versed and trained in its operation, otherwise, tank water can be lost resulting in difficulty drafting.



www.GotBigWater.com

*This program was developed by
GBW Associates, LLC*

© 2010

*No part may be used or copied
without expressed written consent.*

*For more information contact us at
thebigcamel@gotbigwater.com*