Jackson Hole Fire/EMS Operations Manual

Approved by: _____
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PURPOSE

To provide a guideline for establishing an adequate and sustainable water supply on incidents where sufficient water supply for firefighting does not exist.

SECTION I – DEFINITIONS

Attack Engine – Engine located at the fire location supplying the fire attack lines.

Dump Site – The location near the fire incident where tenders unload their water.

Fill Site - Location utilized to fill tenders during a tender shuttle or location of the supply engine for a relay operation.

Large Diameter Hose (LDH) – Supply hose of 3 1/2 inches in diameter or greater.

Manifold – A gated wye which allows branching of a supply line into either a 3-way or 5-way.

Relay Operation – The movement of water via hose line from a remote source to the fire incident.

Rural Water Supply Areas – locations with no hydrants or inadequate hydrants (< 500 GPM or > 1,000 feet apart)

Siamese Valve – valve taking multiple hose lines to one LDH

Supply Engine – Engine set up at the water source supplying water for either tender shuttles or relay operation.

Tender – A water shuttle apparatus with a tank of 3,000 gallons capacity, utilized for mobile water supply.

Tender Shuttle – The movement of water from a remote source to the fire incident via a tender.

Water Supply Task Force – Composed of 5 Tenders, 2 Engines and a Task Force Leader

Water Supply Task Force Leader – line officer in charge of the water supply operation during an incident.

SECTION II – FIRE FLOW REQUIREMENTS

The fire flow is the amount of water, expressed in Gallons Per Minute (GPMs), required to extinguish a fire in a structure. Determining fire flow can be accomplished by utilizing the National Fire Academy Fire Flow Estimate Formula:

$$GPM = \frac{Length\ x\ Width}{3} \times \%\ of\ Structure\ Involved$$

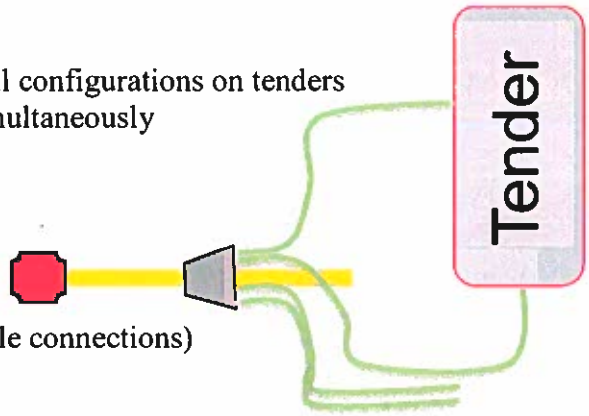
Example: 50% Involved, Single Story Structure, 50 ft. x 50 ft. Fire Flow = 417 GPM

Fire Flow should be estimated based on predicted fire conditions, not on Dispatch information or conditions on arrival.

SECTION III – FILL SITE OPERATION

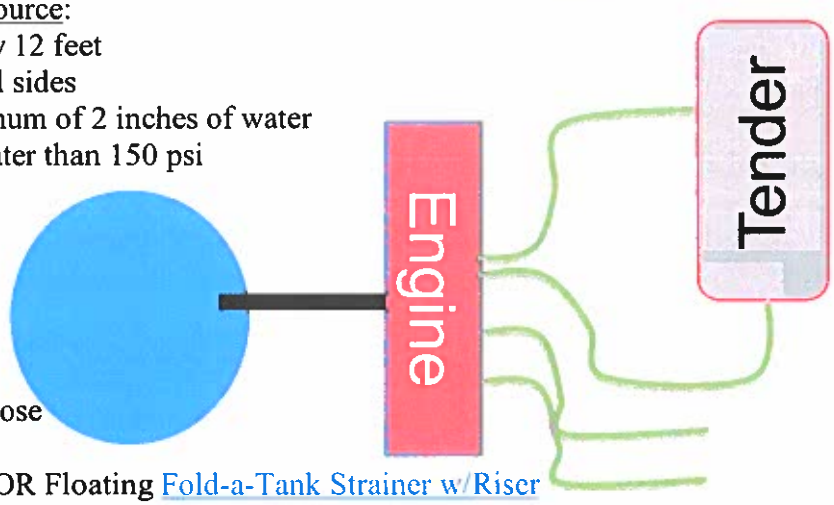
The fill site can either be from a hydrant or from a static source. A direct fill with a hydrant will require a hydrant with flow greater than 500 GPMs. A hydrant with a flow of less than 500 GPM can be utilized as a static source with a porta tank filled by the hydrant and an engine to draft from the porta tank.

Guidelines for Filling from a Hydrant (>500 GPM):
Once Manifold is connected, leave Hydrant Open
Pre-connect both 5" and 3" supply hose for different fill configurations on tenders
4 x 3" supply hoses allows for 2 tenders to be filled simultaneously



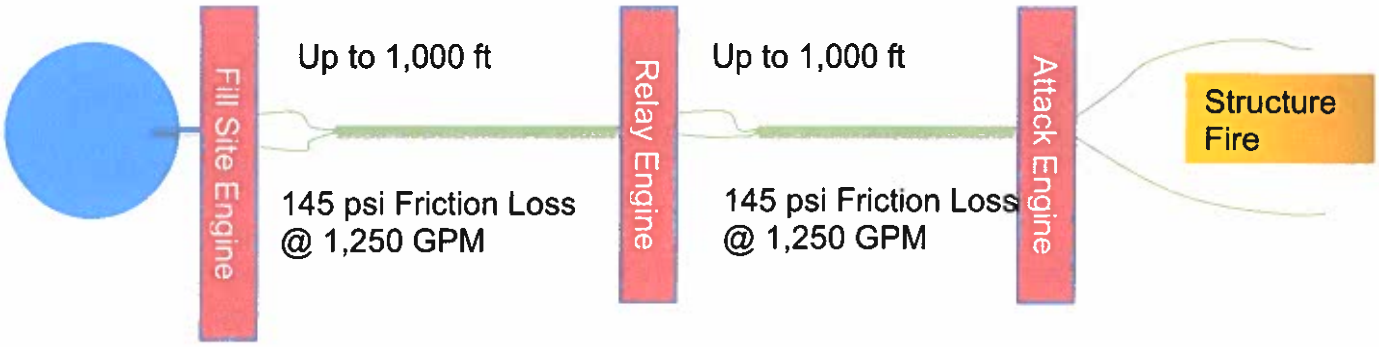
Equipment Needed:
Hydrant Bag
2 x 25' Short Shot 5" LDH with Storz Connections
200' of 3" Supply Hose with 2 ½" NH Connections
5-Way Manifold (5" Storz to 5" Storz and 4 x 2 ½" male connections)

Guidelines for Filling from a Static Source:
Dependable lift for drafting is roughly 12 feet
Cylindrical strainers need 2 feet on all sides
Floating strainers can draft in a minimum of 2 inches of water
Engines should fill Tenders at no greater than 150 psi



Equipment Needed:
2 x 10' sections of 6" Hard Suction Hose
Strainers on Engines (6")
Barrel Strainer, Low Profile Strainer OR Floating Fold-a-Tank Strainer w/Riser
Adaptors for Dry Hydrants in Your Response Area
2 x 50' sections of 3" Supply Hose

SECTION III – RELAY OPERATION



Guidelines for Relay Operations:
GPM based upon the fire flow needed by the Attack Engine.
Distance between engines should be as equalized as possible.
Fill Site Engine will initiate the relay.
Each engine should consider the need for a discharge to keep water moving in the pump. This can be a booster line back to the tank fill to keep from overfilling the tank.
There will be air in the supply hose that will need to be bleed. The Black Max Intake Valve can be used to bleed the air.
Fill Site Engine and Relay Engine(s) should be set in RPM Mode, which allows the pump to only be controlled by the mechanical throttle (no automatic adjustments to engine speed) to maintain consistent GPM and PSI.
Fill Site Engine and Relay Engines must maintain a minimum of 20 psi at the Intake of the next Relay or Attack Engine.
Attack Engine should be set in PSI Mode, which allows the automatic pressure governor to make increases/decreases in engine speed to maintain a set PSI for proper nozzle pressures.
Account for Elevation Pressure loss or gain (5 psi/10 ft.)
Additional distance can be added to the 1,000 feet between pumpers, but there will be a reduction in flow.

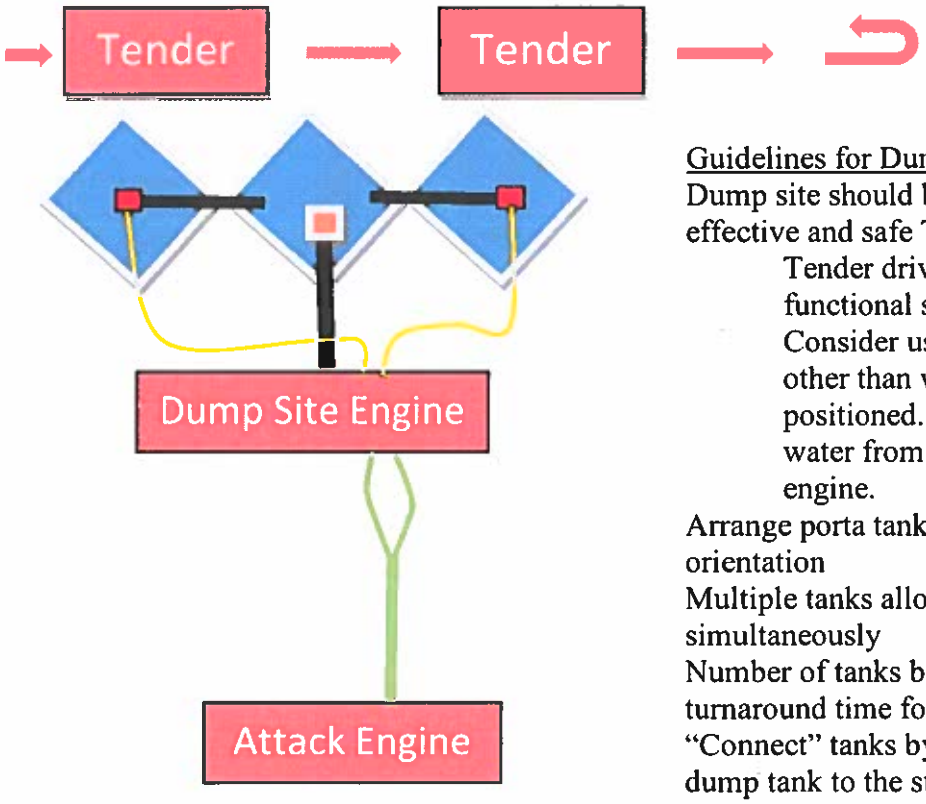
Equipment Needed:
Drafting/Hydrant Connection for Supply Engine
2-Way Siamese – Clappered (2x2 1/2" Female to 5" Storz)
2 x 50' sections of 3" hose for discharge out of Supply/Relay Engines
5" LDH with Storz Connections (700-1,000 ft on each Engine)

SECTION IV – TENDER SHUTTLE OPERATION

GPM that can be supplied by a Tender Shuttle is dependent upon the tender tank size and the amount of time that it takes for the tender to make a complete trip (fill, travel, dump and travel).

$$GPM = \frac{Tank\ size\ in\ Gallons - 10\%}{Trip\ time\ in\ Minutes}$$

In addition to a fill site, a dump site will need to be established.



Guidelines for Dump Site Operations:

Dump site should be in the optimal location for an effective and safe Tender Shuttle

- Tender drive through – no backing with functional side dump
- Consider using a more distant location other than where the attack engine is positioned. Use a supply engine to pump water from the dump site to the attack engine.

Arrange porta tanks in a diamond or square orientation

Multiple tanks allow for multiple tenders to dump simultaneously

Number of tanks based on fire flow required and turnaround time for tenders

"Connect" tanks by using a jet siphon from the dump tank to the supply tank

Pump discharge pressure for the jet siphon set at 150 psi

Equipment Needed:

3500 Gallon Portable Tank(s)

10' Section of 4 ½" Hard Suction Hose

Webbing to secure 4 1/2" Hard Suction Hose

4 1/2" Kochek Low Level Strainer with Jet Siphon

50' section of 1 ¾" hose for each Jet Siphon

6" Low Profile Strainer OR Floating Fold-a-Tank Strainer w/Riser

2 x 10' Section of 6" Hard Suction Hose

SECTION IV – WATER SUPPLY TASK FORCE

A Water Supply Task Force will be automatically paged for the report of a structure fire in areas identified as "non-hydranted". An Incident Commander or Duty Officer can also request a Water Supply Task Force through Jackson Dispatch. Wildland fire or structure fire with inoperable hydrant(s) are examples of when a Water Supply Task Force could be implemented.

Resources assigned to the Water Supply Task Force should proceed to Level 2 Staging until directed otherwise by the Water Supply Task Force Leader. When possible, a separate radio frequency should be assigned to the Water Supply Task Force.

Water Supply Task Force Leader
Checklist

Incident Commander: _____

Command Radio Frequency: _____

Fire Attack Radio Frequency: _____

Water Supply Radio Frequency: _____

Attack Engine: _____ Dump Site/Relay Engine: _____ Fill Site Engine: _____

Tender _____ Tender _____ Tender _____ Tender _____ Tender _____

$$GPM = \frac{Length\ x\ Width}{3} \times \%\ of\ Structure\ Involved$$

Predicted Fire Flow: _____GPM

Single Story, 100% Involved
1,200 sf structure = 400 GPM
2,000 sf structure = 667 GPM
3,000 sf structure = 1,000 GPM
5,000 sf structure = 1,667 GPM
10,000 sf structure = 3,333 GPM

Distance from Fill Site to Fire Scene: _____feet

If Less Than 2,000 feet, consider Relay Pumping with 3 Engines.
If Greater Than 2,000 feet, consider a Tender Shuttle.

Relay Pumping

- € GPM based upon the fire flow needed by the Attack Engine.
- € Distance between engines should be as equalized as possible.
- € Fill Site Engine will initiate the relay.
- € Each engine needs to consider the need for a discharge to keep water moving in the pump. This can be a booster line back to the tank fill to keep from overfilling the tank.
- € There will be air in the supply hose that will need to be bleed. The Black Max Intake Valve can be used to bleed the air.
- € Fill Site Engine and Relay Engine(s) should be set in RPM Mode, which allows the pump to only be controlled by the mechanical throttle (no automatic adjustments to engine speed) to maintain consistent GPM and psi.
- € Fill Site and Relay Engines must maintain a minimum of 20 psi at the Intake of the next Relay or Attack Engine.
- € Attack Engine should be set in PSI Mode, which allows the automatic pressure governor to make increases/decreases in engine speed to maintain a set psi for proper nozzle pressures.
- € Account for Elevation Pressure loss or gain (5 psi/10 ft.)

- Additional distance can be added to the 1,000 feet between pumpers, but there will be a reduction in flow.

Tender Shuttle

GPM that can be supplied by Tender Shuttle:

$$GPM = \frac{Tank\ size\ in\ Gallons - 10\%}{Trip\ time\ in\ Minutes}$$

Number of Tenders Required Based on Tender Cycle Time:

Required Fire Flow	10 Min. Tender Cycle	15 Min. Tender Cycle	20 Min Tender Cycle
250	2	2	2
500	2	3	4
667	3	4	5
833	4	5	7
1000	4	6	8
1333	5	8	

Fill Site

- € Dependable lift for drafting is roughly 12 feet
- € Cylindrical strainers need 2 feet on all sides
- € Floating strainers can draft in a minimum of 2 inches of water
- € Engines should fill Tenders at no greater than 150 psi

Dump Site

- € Dump site should be in the optimal location for an effective and safe Tender Shuttle
  - Tender drive through – no backing with functional side dump
  - Consider using a more distant location other than where the attack engine is positioned. Use a supply engine to pump water from the dump site to the attack engine.
- € Arrange porta tanks in a diamond or square orientation
- € Multiple tanks allow for multiple tenders to dump simultaneously
- € Number of tanks based on fire flow required and turnaround time for tenders
- € "Connect" tanks by using a jet siphon from the dump tank to the supply tank
- € Pump discharge pressure for the jet siphon set at 150 psi