

MONTGOMERY COUNTY EMERGENCY SERVICES DISTRICT NO. 9

Caney Creek Volunteer Fire Department



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DEVELOPING EFFECTIVE WATER SUPPLIES

1.00 PURPOSE

1.01 To ensure that fire flows are developed and maintained in direct relation to fire load, and to deliver the maximum capacity of MCESD#9 Engines.

2.00 OBJECTIVE

2.01 To improve the efficiency of engine companies by the use of reverse lays the proper placement of apparatus, and by maximizing hydrant capabilities.

3.00 DEFINITIONS

3.01 Friction Loss: That part of the total pressure lost as water moves through a hose or piping system, caused by water turbulence and the roughness of interior surfaces of hose or pipe.

3.02 Forward Lay: The laying of hose from a supply source to the fire area.

3.03 Master Stream: Fire stream flowing 350 gpm or greater.

3.04 Reverse Lay: The laying of hose from the fire area to the water source.

3.05 Water Hammer: A pressure surge that accompanies the sudden deceleration or complete stopping of water flow within a pipe or conduit. This force is sometimes sufficient to rupture pipes, fittings, hose lines, etc.

4.00 SCOPE

4.01 This guideline applies to all personnel assigned to Emergency Operations.

5.00 RESPONSIBILITIES

5.01 Incident Commander (IC): The IC is responsible for identifying those incidents that may require the development of an extensive water supply.

5.02 Company Officer: The officer will ensure members are familiar with this guideline and their Company develops effective water supplies on the fire ground.

5.03 Driver/Operator CE/O: Driver/Operators are responsible for the proper development of water supplies on the fire ground utilizing this guideline as a reference.

5.04 Firefighter: The Firefighter(s) are responsible for having a working knowledge of developing fire ground water supplies and using this knowledge appropriately. Firefighter(s) are also responsible to perform any other duties deemed necessary by their Company Officer.

5.05 Water Supply Officer: The Water Supply Officer is responsible for assisting the IC with developing a sufficient water supply and reports directly to the IC.

6.00 GUIDELINES

6.01 Laying a Supply Line (Forward):

- A. Spot apparatus next to hydrant that is to be laid from.
- B. Pull approximately 15 feet of 5" from hose bed and fold with coupling towards engine.

Note:

1. Ensure ample hose is pulled off to make connection and not kink hose.
2. Do not wrap hydrant.

- C. Remove hydrant bag and ball valve(s) from engine.
- D. Signal for the apparatus to leave the hydrant location. The apparatus shall lay 5" on the same side of the roadway as the hydrant is located until reaching the designated stopping point. Just prior to attaining this apparatus stopping point, the driver shall lay 5" across the roadway if the stopping point is on the opposite side of the hydrant. This procedure allows better access for more emergency vehicles.
- E. The plug man will flush the hydrant by:
 1. Removing the steamer cap. Then open hydrant enough to obtain a water flow for about 5 seconds.

Note: Always operate hydrant from the opposite side of the steamer outlet. Close hydrant.

- F. The 5" supply line(s) will now be connected to the hydrant.

Note: D, E, and F can take place simultaneously.

- G. Once desired amount of hose has been laid, Driver/Operator will apply 5" hose clamp at least 20 foot from rear of apparatus. The plug man will then charge hose after radio communication of "charge the hydrant" or universal signal "two hands over head" and rejoin the crew. The 5" will be disconnected from the hose bed.
- H. The supply line will be connected to LDH intake of attack apparatus. The 5" clamp will then be removed. It is preferred to hook up first supply line on Captain side of apparatus.

6.02 Reverse Supply Line:

- A. If the decision is made to implement a reverse lay; stop at the attack engine for the crew to dismount and remove the supply hose.

Note: When doing a reverse lay, always consider access and the space available. The Driver/Operator will proceed to lay a supply line from the fire to a hydrant (if applicable).

B. After laying the supply line, the Driver/Operator will:

1. Correctly spot the apparatus.
2. Disconnect supply hose from the hose bed and attach it to the 5" discharge.

Note: The attack apparatus can now be supplied if necessary.

C. Flush hydrant according to guidelines.

D. Attach 5" fill section to steamer on hydrant.

Note: Ball valve(s) can be connected to hydrant for use later, if necessary.

E. Attach 5" fill section to LDH intake and charge hydrant.

F. Supply attack apparatus according to pump guidelines.

6.03 Relay Pumping:

A. If a supply line of 1000 feet is laid with no other engine(s) connected in the hose line and it's determined that flows in excess of 500 gpm are required; the Engine Company shall notify the IC for relay operations to be initiated.

B. Relay pumping is necessary any time the needed gpm of the attack engine cannot be met because of friction loss in the supply line.

C. To obtain proper flows:

1. The attack engine notifies all engines, in the relay, of the maximum water flow requirement (gpm).

2. Each Driver/Operator in the relay can then determine what pressure to pump in order to attain the needed flow through their engine.

A. Pump pressure is based on the friction loss in the hose for the gpm flowing, plus the 20-50 psi residual pressure needed at the next engine.

B. If the next pump pressure required to attain the needed gpm is greater than 200 psi, additional lines must be laid between the engines.

Note: All relays should start with the Engine at the hydrant developing no more than 100 psi and relaying to the next engine.

6.04 Mutual Aid Ladder Operations:

A. Ladder 121 Aerial can be supplied two ways:

1. Pumping into base.
2. Through pump on L121.

B. Engine Companies that are pumping into a ladder must be no more than 100 feet from the base of the ladder truck.

C. An additional Engine Company should be positioned at the hydrant, to supplement the water supply to the engine supplying the base of the ladder truck or the supply line going into the pump of the ladder truck.

6.05 Rural Water Supply Operations: The Officer on the first arriving apparatus shall make the decision whether or not to lay a 5" supply line into the fire.

Note: Decision is based on:

1. Distance from roadway.
2. Accessibility.
3. Amount of flow needed.

A. Laying Supply Line:

1. Stop apparatus after turning onto driveway.
2. Firefighter shall pull off sufficient hose for incoming apparatus to make connection.
3. Leave 5" hose clamp at fill site/supply site. a. Hose clamp is used to keep water in hose when supplying apparatus change out.
4. Lay into fire and make connection into LDH intake.

B. Tanker Shuttle:

1. The first arriving Tanker or water supply apparatus will be responsible for establishing a fill site/supply site.
 - a. Contact attack pumper and coordinate supply.
 - b. Start at 50-60 psi then coordinate pressure with attack pumper.
2. Depending on needed fire flow and proximity to established water source, it may become necessary to initiate dump tank operations?
3. The use of the 5" clamp can be discontinued if a manifold is put in its place.

Note:

1. Manifold provides 5 intakes instead of 1.
2. If IC deems necessary, a Water Supply Officer will be assigned and another Tac channel given.

C. Fill Site:

1. Apparatus establishing fill site shall notify command of location.
2. On large scale incidents, it may become necessary to establish fill sites in multiple utility districts.
3. Fill site options:
 - a. Hydrant
 1. Achieve maximum flow by using ball valves, manifold.
 - b. Draft.
 1. Using engine draft.
 2. Portable pump(s).
 3. Turbo draft(s).
 4. Dry hydrant.

D. Dump Tank Operations:

1. The use of one or more dump tanks can provide a constant water supply for the attack apparatus.
2. Drafting from dump tank.
 - a. Portable pump or
 - b. Apparatus draft.

6.06 Pump Operations:

- A. The Engine Captain/Officer is responsible for the selection of the appropriate hand line, taking into consideration the potential fire load and visible conditions.
- B. The Driver/Operator is responsible for knowing the correct nozzle pressure, GPM setting and friction loss for the line(s) in use.
 1. Nozzle Pressure:
 - a. Fog Nozzles — 100 psi.
 - b. Smooth Bore Nozzles — 50 psi (80 psi Master stream).
 2. Friction Loss (**per 100ft**):
 - a. Redline: 60 psi.
 - b. 1 3/4": 30 psi.
 - c. 2 1/2": 12 psi.
 - d. 3": 15 psi.
 - e. 5": 8 psi.
 - f. Appliance: 10 psi (25 Master streams).
 - g. Elevation: 5 psi per floor.
 3. Gallon per Minute Flow (Hose):
 - a) 1": 60 gpm.
 - b) 1 3/4": 200 gpm.
 - c) 2 1/2": 250 gpm.
 - d) 3": 500 gpm.
 - e) 5": 1000 gpm.
 4. Gallon per Minute Flow (Nozzle Tips).
 - a. 1/2": 50 gpm 1 1/2" Solid Bore 50 psi.
 - b. 15/16": 175 gpm 1 1/2" Solid Bore 50 psi.
 - c. 1": 200 gpm 2 1/2" Solid Bore 50 psi.
 - d. 1 1/8": 250 gpm 2 1/2" Solid Bore 50 psi.
 - e. 1": 325 gpm 2 1/2" Solid Bore 50 psi.
 - f. 1 3/8": 500 gpm Monitor/Aerial 80 psi.
 - g. 1": 600 gpm Monitor/Aerial 80 psi.
 - h. 1 3/4": 800 gpm Monitor/Aerial 80 psi.
 - i. 2": 1000 gpm Monitor/Aerial 80 psi.
 5. Suggested Pump Pressures:
 - a) Redline: 200 psi.
 - b) 200' 1 3/4" w/Fog nozzle: 160 psi.
 - c) 200' 1 3/4" w/Smooth Bore nozzle: 110 psi.
 - d) 200' 2 1/2 w/Fog nozzle: 124 psi.
 - e) 200' 2 1/2 w/Smooth Bore nozzle: 75 psi.
 - f) Deck gun (Stack tips) : 105 psi
 - g) Deck gun (Fog): 125 psi.
 - h) Turbo Draft: 180 psi.
 - i) Aerial at base: 150-200 psi.

Note: All numbers are general and subject to change based on Officer's decision.

7.00 SAFETY

7.01 Safety should be our utmost concern:

- A. Member should be aware that the emergency operation scenes have many unseen dangers; including moving apparatus and possible hose failure, to structural collapse.
- B. Pressure relief/governors valves should be properly used to decrease the chance of a burst hose, water hammer and/or damage to the pump and plumbing.
- C. All nozzles and valves should be opened and closed slowly to prevent a water hammer thereby lessening the possibility of injury to personnel and damage to equipment.
- D. In the event of water shortage, gate back or shut off exposure lines before interior lines