



Introduction



The availability of an adequate and reliable water supply is paramount to effective fire suppression operations. The fire fighting water supply, be it from a municipal system, private system, cistern, or body of water, must be:

- Rapidly available
- Efficient
- Expandable
- Uninterrupted

This is necessary to sustain long-duration fire suppression operations. A water supply that falls short of these requirements will likely contribute to greater property loss and may contribute to the number and severity of fire-related casualties.

The issue of water supply for fire fighting in Montgomery County was addressed in the *Fire, Rescue, and Emergency Medical Services Master Plan*, adopted by the County Council in October, 1994. Recommendation C.2-1 states:

“The Fire and Rescue Commission, in consultation with the corporations [local fire and rescue departments-LFRDs], should establish criteria for evaluating requests for alternative sources of water where service is not provided by WSSC, the City of Rockville, or the Town of Poolesville. Base information on the availability of public water service, taking into account existing geographic barriers, should be made available to corporations [LFRDs], if necessary.”

Water Supply Work Group

In response to this Master Plan recommendation, as well as related water supply concerns of the Fire and Rescue Commission (FRC), the FRC established the Water Supply Work Group in June 1998, for the purpose of conducting a comprehensive study of these issues and offering appropriate recommendations for improvements. The work group consisted of the following Montgomery County Fire and Rescue Service (MCFRS) personnel:

- District Chief Steven Lohr (Work Group Chairman), representing the Montgomery County Fire and Rescue Service, Division of Fire and Rescue Services

- Chief William (“Scotty”) Cameron, representing the Montgomery County Fire Board
- Mr. Scott Gutschick, representing the Montgomery County Fire and Rescue Service, Fire Administrator’s Office

Work Group Charge

Former FRC Chairman Giebel charged the Water Supply Work Group (WSWG) with the following multi-faceted tasks:

- Identify areas of the County without municipal water supply for fire suppression.
- Review the placement of existing water supply resources (i.e., tankers, dry hydrants, cisterns) to determine where additional resources are recommended or where current resources should be allocated.
- Review water supply for limited access highways and recommend needed enhancements such as new hydrants, siamese connections, preplanning (mapping), etc.
- Develop standardized operational procedures based upon minimum acceptable fire flow and standard response goals for rural water supply, to include tanker/water shuttle operations.
- Establish criteria for evaluating requests for alternative sources of water where water service is not provided.
- Review dispatch procedures for fire incidents in areas lacking a municipal water supply.
- Conduct an adequacy and reliability review of all hydranted areas.
- Determine the current requirements for rural fire flow in the ISO rating schedule.
- Review the requirements of NFPA 1231 – Standard for Water Supplies for Suburban and Rural Fire Fighting.
- Develop an overall water supply coverage map based upon available hydrants, draft supply points, and the fire department’s ability to transport water.

- Develop an inventory of mobile water supply apparatus that is within a five-mile response coverage for any portion of Montgomery County.
- Develop long-range goals to maximize efficiency, minimize the level of unprotected risk, while exploring the insurance rating for Montgomery County.
- Identify pockets of areas without hydrants in areas generally served by municipal water supply, and recommend actions to improve response of water supply units to these areas.

Methodology

The WSWG began its charge in July 1998, with a comprehensive data and information collection effort. The group met with representatives of the various municipal and private water systems. Meetings with the various local fire-rescue departments (LFRDs) were initiated, and site visits were conducted at dry hydrant locations inside and outside of Montgomery County. Federal Government facilities with private water supply systems were evaluated. Important data and maps concerning water supply and fire incidents were gathered and analyzed. Copies of pertinent plans, standards, and reports were obtained. The group also met with the local Insurance Services Office (ISO) representative to discuss the county's ISO rating and to obtain fire flow requirements for properties in Montgomery County. In addition, the WSWG conducted a series of tests to determine the capabilities of the existing water tankers in the county. Input was also sought from the field in the form of a water supply questionnaire and a Standard Training Program session addressing hydrant locations and target hazard locations. The Life Safety Systems Section was contacted to receive input concerning past, present, and future initiatives.

After analyzing the vast array of data, maps, documentation, and related information, the WSWG formulated a list of recommendations for improvements to the fire fighting water supply system. These recommendations appear individually throughout the report, and together in Section VI-The Future.

Meetings

To obtain the most up-to-date information concerning water supply systems and static sources within Montgomery County, the WSWG arranged several meetings and site visits.

The group met with (or corresponded with) the following individuals representing municipal/private water systems, local fire-rescue departments, and the Insurance Services Office:

- Timothy D. Hirrel, Planning Manager, Water Resources Planning Section, Washington Suburban Sanitary Commission (WSSC)
- Daniel Pendergraft, Chief Water Plant Operator, Potomac Water Filtration Plant, Washington Suburban Sanitary Commission (WSSC)
- Edwin Woo, Civil Engineer, City of Rockville Public Works Department
- Wade Yost, Engineer, Town of Poolesville Public Works Department
- Fred E. Brower, Senior Field Representative, Insurance Services Office, Inc.
- Dennis Wenner, Safety Manager, PEPCO Power Plant, Dickerson, Maryland
- Tony Valez, Chief Engineer, Ogden-Martin Systems of Montgomery, Inc., Montgomery County Resource Recovery Facility, Dickerson, MD
- Chief Gary Hess, National Institutes of Health Fire Department, Bethesda, MD
- Chief Charles Elgin, Jr., Upper Montgomery County Volunteer Fire Department
- Chief Douglas Edwards, Hyattstown Volunteer Fire Department
- Former Chief J. B. Kline and District Chief Matt Montgomery, Laytonsville Volunteer Fire Department
- Chief Darron Long and line officers, Damascus Volunteer Fire Department
- Chief Alan Hinde and line officers, Rockville Volunteer Fire Department
- Chief George Brown and Deputy Chief Bruce Newcomer, Sandy Spring Volunteer Fire Department
- Chief James Seavey, Cabin John Park Volunteer Fire Department
- District Chief Stanley Tetlow, Fire-Rescue Communications, Division of Fire and Rescue Services, MCFRS
- District Chief John Walters, MCFRS (Retired)

- Mark Deputy, Automated Systems Manager-CAD, Department of Information Systems and Telecommunications, Montgomery County, MD.
- Mr. Larry Davis, Fire Protection Water Supply Consultant
- Various MCFRS volunteer and career personnel

Site Visits

The WSWG visited the following sites to obtain first-hand information about private water supply systems, dry hydrants, static sources, and water supply systems for limited-access highways:

- PEPCO Power Plant, Dickerson
- Ogden-Martin Systems of Montgomery, Inc., Montgomery County Resource Recovery Facility, Dickerson
- National Institutes of Health Animal Research Center, Poolesville
- Naval Surface Warfare Center, Carderock
- I-495 American Legion Bridge at Cabin John - dry standpipe with FD connections
- Town of Barnesville – target hazards, underground water tank
- Clarksville Volunteer Fire Department, Howard County, Maryland
- Dry Hydrants in rural areas of Howard County, Maryland:

Connected to 18,000 gal cistern, Highland Road 100 yards north of Rt-108

Connected to private pond, Lime Kiln Road at Reservoir Road

Connected to private pond, Lime Kiln Road west of Rt.- 216

Connected to private pond, Rt-108 about one mile west of Ten Oaks Road

- McLean Volunteer Fire Department, Fairfax County, Virginia
- Prince William County, Virginia, Station 16
- Dry Standpipes along I-495 in Fairfax County, Virginia:
 - Rt-193 overpass at I-495
 - Rt-7 overpass at I-495
- The Winfield Volunteer Fire Department, Carroll County, MD. Winfield Mile, ISO Evaluation.

GIS Maps, Data, and Fire Incident Data

The WSWG made extensive use of the county's Geographic Information System (GIS) to obtain maps displaying water supply data. With outstanding support provided by Tim Taormino of the Department of Information Systems and Telecommunications' GIS Office, the Work Group was able to obtain the following maps:

- Hydranted vs. non-hydranted areas of the county
- Locations of WSSC hydrants
- 5-mile road network coverage of existing tankers
- 5-mile road network coverage of proposed tankers
- 5-mile road network coverage of proposed tankers, including a tanker at Clarksburg (1"= 5000 ft scale and 1"= 3 mile scale)
- Hydrants along I-495, I-270 and I-370, with 1000-foot intervals between overpasses noted

The maps allowed the WSWG to examine the extent of hydrant and tanker coverage throughout Montgomery County, which, in turn, led to several of the group's conclusions and recommendations.

The WSWG also obtained CY94-98 fire loss data from the National Fire Protection Association and the MCFRS, Life Safety Bureau, Division of Fire and Explosion Investigation Office. The information was analyzed by the WSWG to determine the year-to-year fire loss history nationwide and in the county, which directly relates to the county's ISO rating.

Reports, Plans, and Related Documents

As a result of the earlier mentioned meetings and research efforts, the WSWG obtained copies of a number of emergency operations plans, reports, and other information related to the work group's charge. A list of these items is presented below.

- Metropolitan Washington Water Supply Emergency Plan, developed by the Drinking Water Emergency Agreement Task Force, Metropolitan Washington Council of Governments, October, 1994
- Montgomery County Emergency Operations Plan, Annex U – Utilities, August, 1996
- WSSC Water Design Guidelines, Section 25 – Fire Hydrants, October 1995

- Report of fire hydrant testing in town of Poolesville, Kamber Engineering, Inc.
- Prince William County, Virginia, SOPs concerning water supply:
 - “Incident Command/Water Supply Officer”
 - “Rural Water Supply Operations”
 - “Building Preplans/Water Supply”
 - “Fill Site Preplans”
 - “Tanker Task Force”
 - “Tanker Radio Designations”
- “Compressed Air Foam for Structural Fire Fighting: A Field Test, Boston, Massachusetts”
- “Compressed Air Foam Systems In Limited Staffing Conditions”: Robert G. Taylor, Morristown Fire Bureau, Morristown, New Jersey

NFPA Standards 1231 and 502

A copy of NFPA Standard 1231–1993 edition; Water Supplies for Suburban and Rural Fire Fighting, and NFPA Standard 502–1998 edition; Standard for Road Tunnels, Bridges, and Other Limited Access Highways was obtained by the WSWG. These standards are cited in the work group’s recommendations, and addresses the following topics of specific interest to the WSWG:

- Determining minimum water supplies for various hazard/construction types
- Water supply for fire fighting
- Water supply transfer
- Identification and accessibility of water sources
- Water hauling
- Large diameter hose
- Secondary water supply
- Dry standpipes for roadways, bridges, and tunnels

Input from Field Suppression Forces

On July 27, 1998, the WSWG disseminated a memorandum to IECS - certified command officers seeking input on water supply issues in their respective station areas. The officers were given a questionnaire (see copy in Appendix A) asking their opinion on minimum gallon per minute (GPM) flow requirements for initial attack and defensive attack for a series of common occupancy types. A house-rural setting, house-urban setting, barn, commercial

building, school, and church were offered as potential scenarios. The officers were asked to recommend whether or not an elevated stream should be established for each occupancy type. In addition, the officers were asked for their opinion on minimum GPM flow requirements for initial attack, and extended defensive attack for two highway-related water supply scenarios: a propane tanker fire at the intersection of I-495, I-270, Route-355, and the METRO Red Line overpass in Bethesda; and a propane tanker fire on I-270 in Clarksburg.

Addressing the particular issue of rural water supply, the WSWG Chairman, in August 1998, distributed a Tanker Data Survey, (see Appendix B) to stations located in rural areas of the county. The tanker survey was sent only to those stations having tankers: Stations 9, 14 and 17. The tanker survey asked for information concerning tank capacity, vehicle dimensions and weight, discharge and fill capabilities, hose complement, appliances, etc.

The Rural Water Supply Questionnaire sought drafting points in non-hydranted areas such as lakes, streams, cisterns, etc. It specifically asked for locations, distance from fire ground, vertical lift, minimum water depth, all weather access, and dry hydrant data if applicable.

The Target Hazards Work Sheet was designed to identify three target hazards in each of the rural stations first due area, presumably worst case rural scenarios. The information was intended for use by the WSWG to calculate required fire flows for local worst case rural fire scenarios.

In addition to input obtained directly from the IECS-certified command officers, the WSWG also sought input from all MCFRS field personnel concerning hydrant coverage and target hazards in their first-due areas. By means of a Standard Training Program session occurring November 17-19, 1998, field personnel were provided GIS generated 600-scale maps of their first-due areas showing streets and hydrants. Using these maps, personnel were asked to highlight non-hydranted areas or any area requiring more than a two-pumper relay (assuming 600 feet between pumpers). They were also asked to flag any hydrants that had produced low flow/pressure during incidents, and to mark the locations of target hazards having fire flow requirements that exceed available water supply. Maps with the requested information were returned within six weeks and analyzed by the WSWG. A database was created identifying these items by station area and is included in Appendix C for review. A copy of the maps and the completed database were returned to DIST-GIS for corrections as noted.