

**MEMORANDUM**

September 18, 2012

TO: County Council

FROM:  Keith Levchenko, Senior Legislative Analyst

SUBJECT: **After Action Review of June 29 Storm Event: Washington Suburban Sanitary Commission (WSSC)**

Meeting participants include:

- **Executive Branch**
  - Richie Bowers, Chief, Fire and Rescue Services
  - Chris Voss, Manager, Office of Emergency Management and Homeland Security (OEMHS)
- **WSSC**
  - Jerry Johnson, General Manager/Chief Executive Officer
  - Jim Neustadt, Director of Communications & Community Relations
  - Karen Wright, System Control Group Leader
  - Jay Price, Production Team Chief, WSSC
- **Pepco**
  - George Nelson, Pepco Holdings, Inc., Vice President Operations and Engineering
  - Charles Washington, Senior Public Affairs Manager, Maryland State Relations, Pepco and Delmarva Power

Attachments to the packet include:

- Fire and Rescue Services and OEMHS Presentation Slides (©1-8)
- Excerpt: Derecho, June 29, 2012 After Action Report/Improvement Plan Executive Summary (©9-14)
- WSSC Presentation Slides (©15-43)

On July 24, the Council received a presentation from Chris Voss of the County's Office of Emergency Management and Homeland Security (OEMHS) on the June 29 "Derecho" storm event and the coordinated County response.

On July 19, the Council discussed the storm event with Pepco representatives regarding Pepco's preparation, response, and customer communication efforts.

As noted at the July 24 meeting, the County faced two concurrent emergency events: the "Derecho" storm and a record-breaking heat wave. The loss of power to 238,000 (or 77 percent) of

Montgomery County's 309,583 Pepco customers (plus large portions of the County's BG&E and First Energy customers<sup>1</sup>), including many County facilities and private nursing homes and assisted living facilities serving vulnerable populations, presented significant challenges.

At the July 24 meeting, Councilmembers expressed an interest in having Council committees follow up on some issues in more detail.<sup>2</sup> The focus of the T&E Committee meeting on September 20 is on WSSC issues. Council Staff has invited WSSC and Pepco officials, as well as Mr. Bowers and Mr. Voss, to provide short presentations, followed by an opportunity for questions and further discussion.

### **WSSC Reliance on Electricity**

While the June 29 storm event was extremely disruptive because of the widespread and lengthy power outages in the County, the consequences could have been much worse if public water infrastructure had not been brought back on line as quickly as it was.

A significant loss of water pressure reduces firefighting capabilities. Chief Bowers will be available at the meeting to note some of these issues and to discuss how the Fire and Rescue Service worked around some of the initial water pressure concerns from the June 29 storm event.

The loss of public water to critical facilities (such as hospitals) obviously raises life-safety concerns, and the loss of water to businesses (such as restaurants) can result in severe economic impacts. The County experienced its only boiled water advisory on record back in June of 2008, when a 48-inch diameter section of prestressed concrete cylinder pipe (PCCP) broke in parkland near the intersection of Muncaster Mill Road and Meadowside Lane.

WSSC is highly reliant on electricity to operate its two water filtration plants (The Potomac Water Filtration Plant located on River Road in Potomac, and the Patuxent Water Filtration Plant located on Route 198 in Laurel). Combined, these plants produce an average of about 170 million gallons of water per day (mgd) for the entire WSSC service area. Far more (about 200 mgd) is produced daily during summer months (like during the June 29 storm event), with less in the winter months (around 150 mgd). About two-thirds of WSSC's water production is from the Potomac Water Filtration Plant. WSSC also utilizes a number of water pumping stations and wastewater pumping stations and wastewater treatment plants that also require electrical power.

WSSC also maintains a number of above ground storage facilities with a maximum storage capacity of about 174 million gallons.

Because of the criticality of the Potomac Water Filtration Plant, it is included on Montgomery County's Power Restoration Priority List (along with hospitals (5), 911/EOC Centers (2), nursing homes (34), large assisted living facilities (27), and the County's two

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<sup>1</sup> Most of the County's BG&E customers (13,622 out of 13,663) and about one-third of the County's First Energy customers (9,823 out of 28,725) also lost power.

<sup>2</sup> Other follow-up committee meetings that have been scheduled include a Public Safety Committee meeting on October 4 focusing on the public safety agencies preparation and response and a Government Operations and Fiscal Policy Committee meeting on October 8 looking at cable companies.

correctional facilities).

The Potomac Plant receives its power from two 69kV feeders from the same Pepco substation. The Potomac Plant has two on-site transformers which step down the voltage for distribution within the plant. The plant (which has two separate treatment streams) requires a minimum of approximately 10MW of power to run one of the treatment streams.

WSSC has an ongoing comprehensive power reliability analysis underway that is looking at water treatment and distribution as well as wastewater treatment and collection systems. This study is expected to be completed in June 2013.

### **June 29 Storm Event and WSSC**

OEMHS held an after-action meeting with EMG members on July 19 to review the County Government's efforts (asking what went well and what can be improved) and to begin to identify issues requiring further review and potential future action. OEMHS has prepared an after-action report which is available at: <http://www.montgomerycountymd.gov/content/council/pdf/REPORTS/Derecho.pdf>. The Executive Summary is attached on ©9-14.

The effect of the June 29 storm event on WSSC's two filtration plants is summarized in the OEMHS after-action report excerpt below:

*The Washington Suburban Sanitary Commission's (WSSC) Patuxent and Potomac water treatment facilities both lost electrical feeders, rendering the plants out of service. As a result, water was supplied to residents by existing system pressure only, which quickly reduced system capacity. WSSC issued mandatory water restrictions and OEMHS immediately requested that the WSSC plants be given the highest priority with respect to power restoration. The Patuxent plant had power restored in the early a.m. on June 30th and one of two main feeder lines were returned to the Potomac plant approximately 11 hours following the storm.*

In addition, since much of the County lost power, a number of other WSSC facilities lost power as well. In one case, the Wheaton Pumping Station, a facility which would not normally be considered as high a priority for restoration, became a high priority because a large diameter water transmission line was also out of service due to scheduled maintenance. With the transmission line out of service, the Wheaton Pumping Station was a critical facility in providing water pressure to the Montgomery "High Zone" (northern areas of the county, see ©27). That facility's power was restored by the evening of June 30<sup>th</sup>.

Excerpts from the OEMHS' after-action report which relate specifically to WSSC are provided below. These excerpts highlight concerns and areas for follow-up by major "core capability" category.

## **CORE CAPABILITY 2: COMMUNITY RESILIENCE**

**Capability Definition:** Lead the integrated effort to recognize, understand, communicate, plan, and address risks so that the community can develop a set of actions to accomplish Mitigation and improve resilience.

### **Area for Review 2.2: Back-up power capability at WSSC Water treatment facilities.**

**Observation:** For the second time in 2 years the WSSC Potomac water treatment facility had both of its electrical feeder lines damaged and out of service. In the aftermath of both storms, the water reservoir system drained quickly and mandatory water conservation measures were announced.

#### **Recommendations**

1. Discuss with WSSC the purchase and installation of back-up power generators for its Potomac treatment facility as a future mitigation measure.

**Lead: OEMHS**

## **CORE CAPABILITY 11: INFRASTRUCTURE SYSTEMS**

**Capability Definition:** Stabilize critical infrastructure functions, minimize health and safety threats, and efficiently restore and revitalize systems and services to support a viable, resilient community.

### **Area for Review 11.1: Criticality of the WSSC Wheaton pumping station**

**Observation:** WSSC had taken a critical distribution pipeline out of service for repairs. Although the repairs were scheduled to be completed months prior to the event, the main pipeline was still out of service. As a result, the Potomac plant had limited ability to supply water to the high zone and was relying on a pumping station in Wheaton that had also lost power. The primary issue is that WSSC failed to quickly notify the county of the Wheaton pumping station impact. Only after power was restored to the Potomac Water Treatment Plant, did the county understand the criticality of Wheaton Pumping Station and made it a priority for Pepco.

#### **Recommendations**

1. Review notification protocols and make the appropriate changes.

**Lead: WSSC**

2. Consider plans to provide power redundancy to critical WSSC locations.

**Lead: WSSC**

### **Area for Review 11.4: Enforcement of mandatory water restrictions**

**Observation:** The County did receive complaints of residents and businesses not following the WSSC water restriction after it was announced.

#### **Recommendations**

1. WSSC and the county should review both their enforcement policies and notification methods to improve compliance with WSSC water restrictions and advisories.

**Lead: OEMHS**

## Council Staff Questions/Issues

Council Staff believes the T&E Committee should focus its discussion on WSSC's system reliability and redundancy (both specifically in the context of the June 29 storm event and in general with regard to potential future events). The reliability of electrical power to WSSC's infrastructure and the ability for Pepco to restore power in a timely manner are also key issues.

With the above focus in mind, Council Staff forwarded a number of questions (see below) to OEMHS, WSSC, and Pepco in advance of the meeting. Both OEMHS and WSSC prepared presentation slides (attached on ©1-8 and ©15-43). Pepco staff will also be available at the meeting to respond specifically to electrical reliability and power restoration issues.

1. Please provide a summary of the June 29 storm event specific to WSSC's major impacted facilities. Be sure to include when power was lost or other major damage occurred and what the immediate impact on WSSC's operations was and how you modified operations to address the problems. Please also note the coordination that occurred between WSSC, the EOC, and Pepco and when work was initiated and completed to restore operations at the facilities. (OEMHS and WSSC)
2. What is WSSC's overall assessment of Pepco's power restoration efforts for WSSC's facilities? (WSSC)
3. Please describe the major projects WSSC is pursuing with regard to electricity reliability at its facilities. (WSSC)
4. Please describe the major projects WSSC is pursuing to improve water system reliability/redundancy in the future. (WSSC)
5. What reliability work has Pepco pursued in the past several years to improve reliability to WSSC's major facilities? What is planned for the near- and long-term? The Potomac Plant has lost power during several of the major storm events over the past several years. What are the major causes of these power losses and what is Pepco doing (or planning to do) to minimize loss of power to the Potomac Plant in the future? (Pepco)
6. How long can the Potomac Plant be out of service before water pressure drops below acceptable levels in various parts of Montgomery County? How much time does utilizing water storage facilities provide to the system? How much backup water can the Patuxent Water Filtration Plant provide to areas normally served by the Potomac Plant? Please note how long the Potomac Plant been out of service due to major weather events in recent years. What is a reasonable time goal within which the Potomac Plant needs to be brought back on-line to avoid major water pressure/water quality problems? Is this goal reasonable given the status of current infrastructure? If not, what needs to be done to better ensure the time goal can be met? (WSSC)

7. If water pressure in parts of the County were to drop below acceptable levels for fire suppression purposes, what alternatives does Fire and Rescue pursue to ensure it maintains adequate capabilities to fight fires? (FRS)
8. What levels of water usage restrictions does WSSC have the authority to employ? How much demand reduction can one assume from voluntary water reduction requests and mandatory water reduction orders? What role does County Government play in WSSC's consideration of water use restrictions and boil water advisories? (WSSC)
9. The Wheaton pumping station is not normally included on the County's Power Restoration Priority List during power outages. However, during the June 29 storm event, this facility was critical to serving the Montgomery High Zone, because a major water transmission line was out of service for maintenance and repair work. What information does WSSC currently provide to OEMHS with regard to "temporarily critical" facilities? What changes to this communication are OEMHS and WSSC considering in light of the June 29 storm event? (WSSC and OEMHS)

#### Attachments

F:\Levchenko\Emergency Management\Council Packets and Presentations\June 29 2012 storm event briefing on WSSC issues 9 20 12.doc

# **WSSC Infrastructure and Discussion**

**Fire Rescue Services  
and the Office of Emergency  
Management and Homeland Security**

**Derecho Storm Event**

**June 2012**

# FRS – WSSC Discussion

## ▪ Criticality of WSSC Infrastructure

### ▪ Water supply – Critical Elements

- Adequate water supply in system for fire suppression
- Fire suppression systems – residential and commercial
- High rise fire pumps (power)
- High rise standpipe systems
- High rise sprinkler systems – wet and dry systems
- Hydrant system supply
- Reservoir tank capacity

### ▪ Water pressure – Critical Elements

- Maintaining adequate water system pressure
- Hydrant system pressure
- Fire pump capacity in High Rise structures
- Sprinkler system pressure – wet and dry systems
- Reservoir tank capacity

# FRS – WSSC Discussion

## ▪ Implications – Negative

- Impacts system supply and pressure capacity
- Impacts fire suppression system capabilities
- Impacts fire suppression operations
- Impacts fire flow requirements and capabilities @ structure fires
- Impacts residential and commercial occupancy fire ground operations
- Impacts occupant and firefighter safety

# FRS – WSSC Discussion

- FRS Operations – Adjustments
  - Adjustment to Standard Operating Procedures @ structure fires
  - Adjustment to dispatch and response to structure fires
  - Re-deployment of water on wheels in the county – Tankers
  - Mutual aide request for Tankers
  - Communications with WSSC

# WSSC Coordination with the EOC and Derecho Timeline

- The Storm began impacting the county at approximately 10:25
- By 11:01 the county had 135,000 outages and order to activate the Emergency Operations Center (EOC) was given.
- An EMG call was also initiated at 12:30am
- A total of 14 EMG calls were held during the event
- WSSC quickly responded to the EOC after the activation was initiated
- WSSC participated in each EMG call
- WSSC initiated mandatory use restrictions for all customers at 5:57am June 30<sup>th</sup>. Restrictions were lifted at 12:03pm July 1, 2012
- A top Pepco priority was to restore the WSSC Potomac Plant. This was accomplished at approximately 9:15am June 30, 2012
- Wheaton pumping station, also identified as critical, had power restored at approximately 8pm June 30, 2012

# After Action Report

## - Areas for Review with WSSC

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- **Area for Review 2.2: Back-up power capability at WSSC Water treatment facilities.**
  - **Observation:** For the second time in 2 years the WSSC Potomac water treatment facility had both of its electrical feeder lines damaged and out of service. In the aftermath of both storms, the water reservoir system drained quickly and mandatory water conservation measures were announced.
  - **Recommendations**
    - Discuss with WSSC the purchase and installation of back-up power generators for its Potomac treatment facility as a future mitigation measure. **Lead: OEMHS**

# After Action Report

## - Areas for Review with WSSC

- **Area for Review 11.4: Enforcement of mandatory water restrictions**
  - **Observation:** The County did receive complaints of residents and businesses not following the WSSC water restriction after it was announced.
  - **Recommendations**
    - WSSC and the county should review both their enforcement policies and notification methods to improve compliance with WSSC water restrictions and advisories.  
**Lead: OEMHS**

# After Action Report

## - Areas for Review with WSSC

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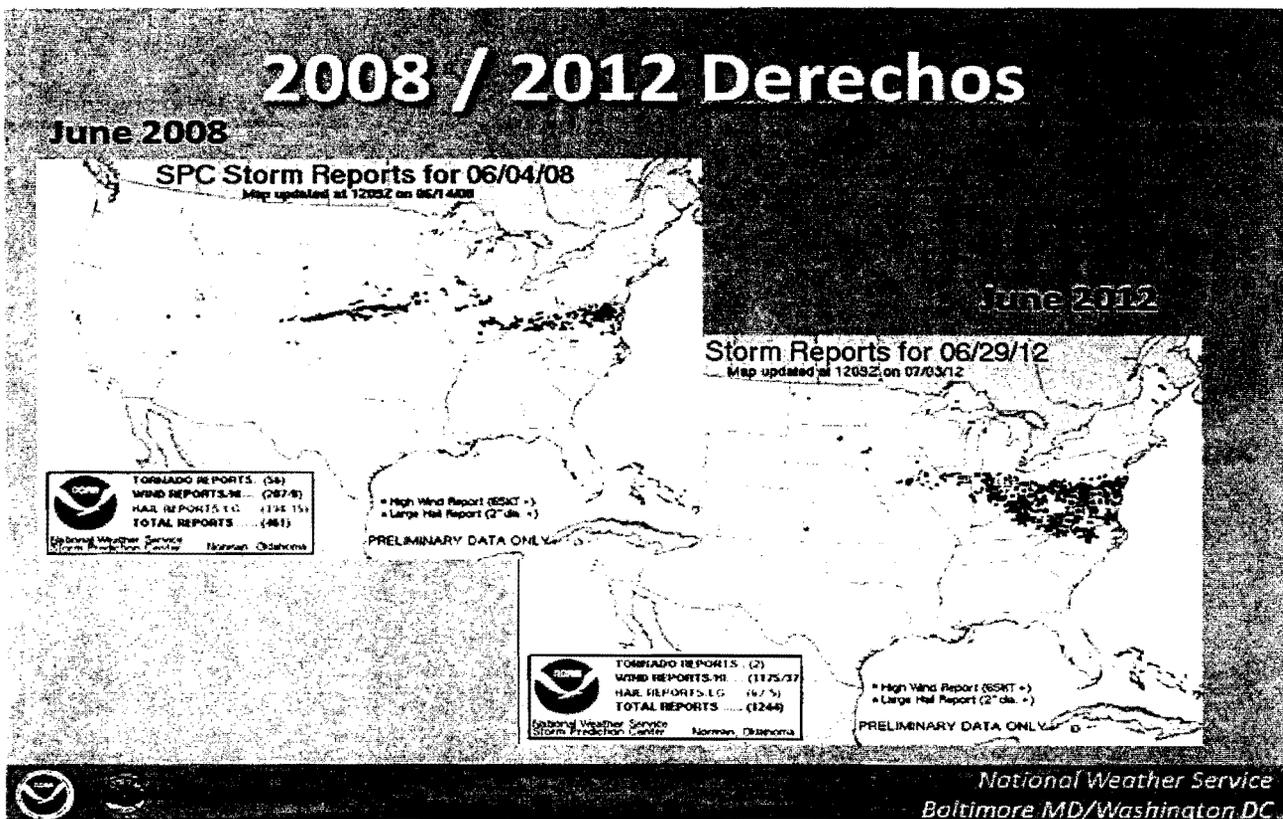
- **Area for Review 11.1: Criticality of the WSSC Wheaton pumping station**
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  - **Recommendations**
    - Review notification protocols and make the appropriate changes. **Lead: WSSC and OEMHS**
    - Consider plans to provide power redundancy to critical WSSC locations. **Lead: WSSC**

# EXECUTIVE SUMMARY

On June 29, 2012 Montgomery County experienced a unique combination of weather events unlike any in recent memory. Not only did the Washington Metropolitan area set a new record high temperature for the day (104 degrees F), but in the evening the region was hit by a powerful straight line windstorm or derecho, which struck our area at approximately 10:30 pm. The term "derecho" applies to a complex line of thunderstorms that travels a minimum distance of 240 miles (~400 km) or more, and produces a nearly continuous and widespread swath of damaging winds over that distance, with concentrated areas of wind speeds over 58 mph (93 km/hr). In general, derechos happen about every few years in the mid-Atlantic. However, just like all hurricanes don't have the same impact, the same is true for derechos. While the last derecho in our area was 4 years ago, their impacts varied greatly. The severity and extent of damage with the 2012 event was likely a once in a few decade event.

Derechos can travel distances well over 250 miles (400 km). The recent derecho on June 29th travelled over 700 miles (in 12 hours) from its start in Iowa to the East Coast and had maximum wind gusts to 70 mph. (National Weather Service)

Figure 1 – 2008/2012 Derecho Map<sup>1</sup>



Note:

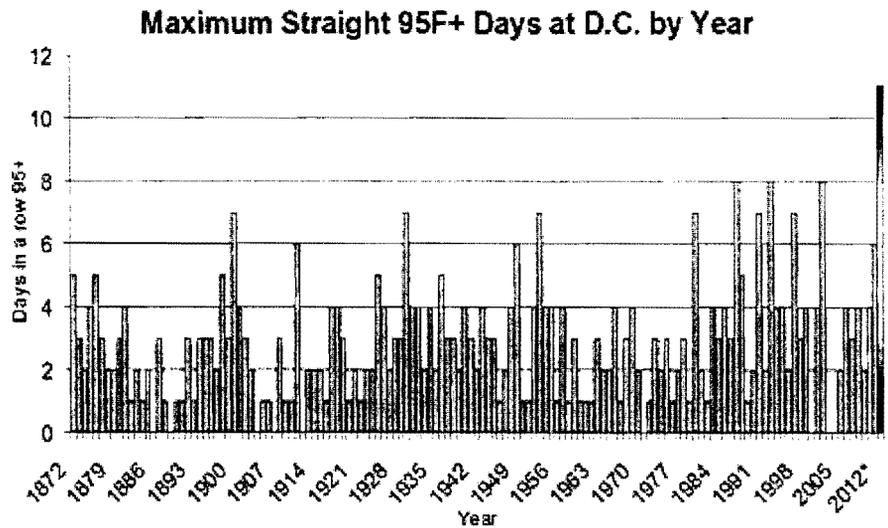
- \* The extent of reported damage (blue dots) in 2012 compared with 2008
- \* The amount of "black boxes" on the 2012 storm, which represent hurricane force wind gusts.
- \* That the 2008 storm had more tornadoes (red dots)

In addition to the Storm, the county was also experiencing extreme heat both during the event and during the several days after the event. It was the combination of these two hazards which added to the complexity of the county's responses and resulted in more proactive decision making especially with regard to opening county facilities on the 4<sup>th</sup> of July and keeping some other public locations open longer so residents could escape the heat.

The heat wave experienced during and after the derecho was one of the worst on record for the Washington DC area with a record 11 days in a row with the temperature reaching over 95 degrees.

There was one fatality directly associated with this event and one which may have been a contributing factor; one, which was storm related, occurred when a very large tree fell on a house trapping one occupant. The second which may have contributed to a death was a heat related fatality of an elderly man, on the 15<sup>th</sup> floor of a high-rise apartment without power, on day 4/5 of this event.

**Figure 1**



The Average temperature during the 11 day stretch was **99.5** degrees (F) also a record for Montgomery County. The county sent out 25 press releases and 20 Alert Montgomery messages, many with information on how to stay safe during the storm, information on county services, but also several with information on how to stay safe under extreme heat situations. For the Alert Montgomery system, this was a variance from the Standard Operating Guidelines, but staff felt it was justified due to both the power outages and heat impacting many residents in the county which would also limit access to other communication systems including television.

**Figure 2**

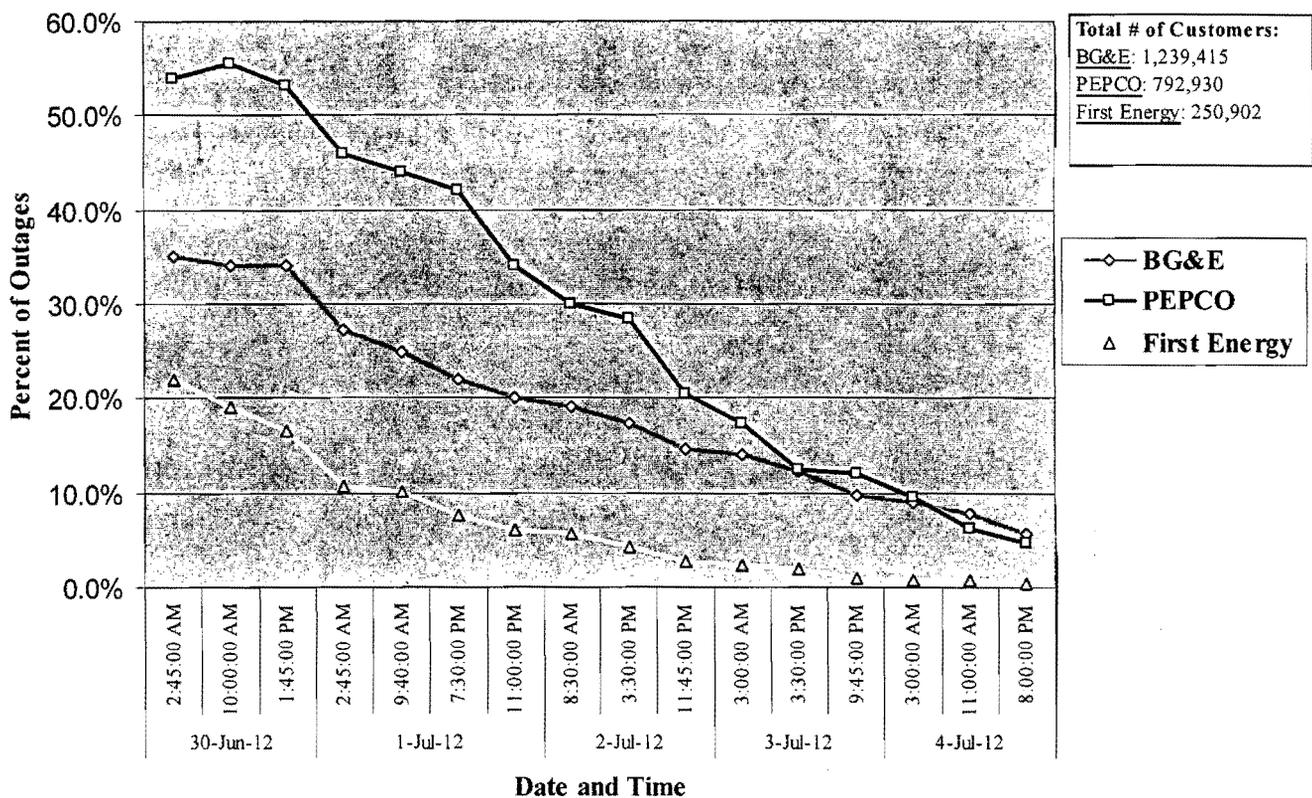
**Top 10 Hottest 11-Day Stretches in D.C.**

Year	Dates	Avg Hi	Highest	Days 100+
2012	6/28-7/8	99.5	105	5
1930	7/19-7/29	99	106	6
2011	7/22-8/1	97.9	104	4
1993	7/4-7/14	97.4	100	3
1988	7/7-7/17	97.3	104	4
1980	8/1-8/11	97	100	2
1953	8/25-9/4	96.5	100	2
1988	8/7-8/17	96.3	103	2
1999	7/23-8/2	96.2	101	1
2002	8/10-8/20	96.1	100	1

Montgomery County is supported by three power utility companies; Pepco; BG&E, and First Energy. Pepco services the vast majority of customers with 309,000. All three utilities were significantly impacted across their entire service areas (See Figure 3 – Total Customer Outages for all service Areas) As a result of the storm, approximately 74% of the county lost power, and more than 250 streets were closed with debris. The National Weather Service storm survey estimated that the winds reached 60-70 mph with gusts of 75-80 mph in some locations. Most residents in the county had power restored within 5 days (over 90%), with the final impacted customers having their power restored 9 days after the event.

Figure 3

### Total Customer Outages for All Service Areas

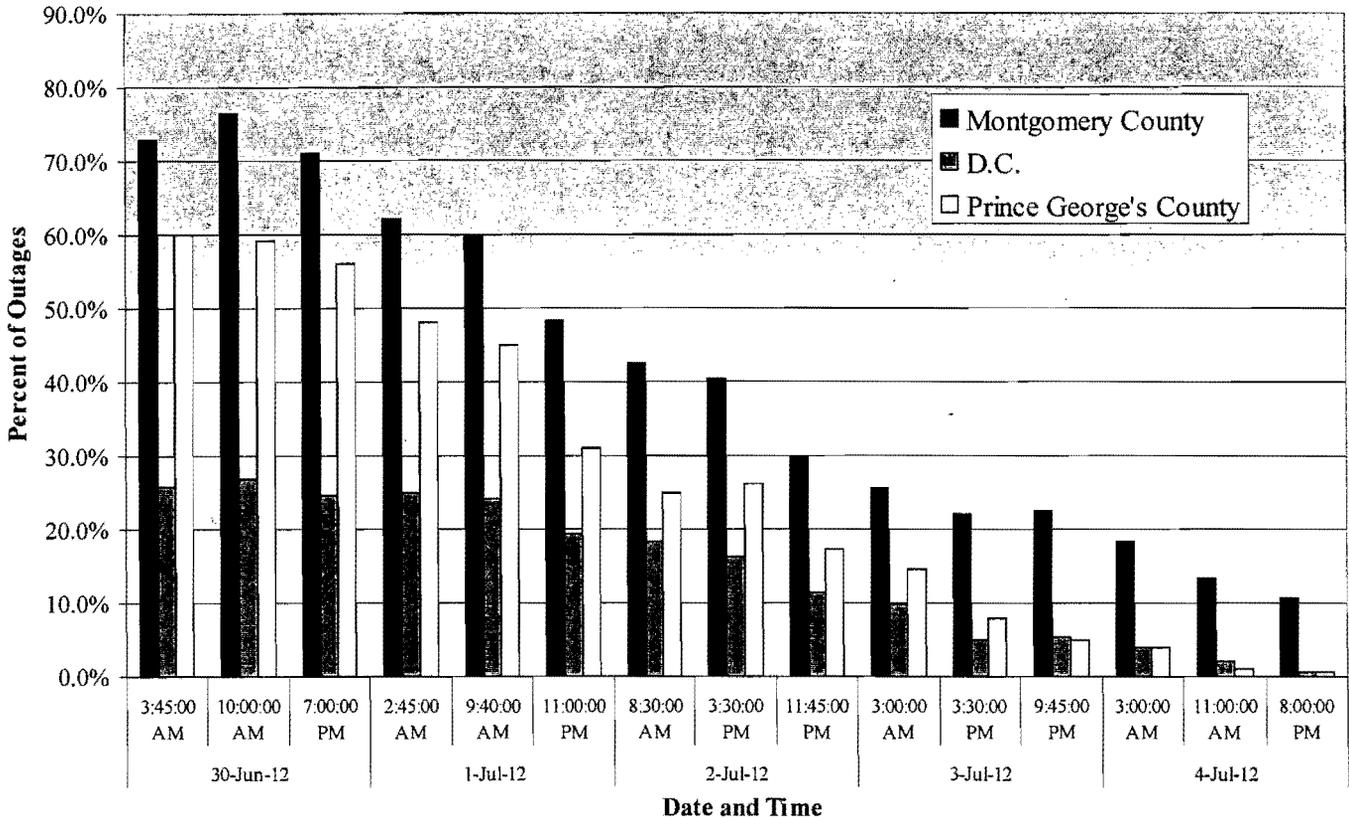


Between 10:30 pm and 11:00 pm on the night of the storm the recorded power outage numbers in Montgomery County quickly climbed from 5,000 to 135,000. The Emergency Operations Center (EOC) was activated to Level 2 at 11:00 p.m. on the 29<sup>th</sup> and remained activated for 7 days. The response from County agencies, Pepco and WSSC was nearly immediate, with representatives reporting to the EOC. The initial storm assessment had 238,000 customers without power at its peak with full restoration accomplished on the afternoon of July 8<sup>th</sup>. Although Pepco's entire service area was impacted, Montgomery County was burdened with the greatest percentage of outages at 77%. See Figure 4 – Pepco System Outages



Figure 4

## PEPCO System Outages



The Washington Suburban Sanitary Commission's (WSSC) Patuxent and Potomac water treatment facilities both lost electrical feeders, rendering the plants out of service. As a result, water was supplied to residents by existing system pressure only, which quickly reduced system capacity. WSSC issued mandatory water restrictions and OEMHS immediately requested that the WSSC plants be given the highest priority with respect to power restoration. The Patuxent plant had power restored in the early a.m. on June 30<sup>th</sup> and one of two main feeder lines were returned to the Potomac plant approximately 11 hours following the storm. The EOC demobilized on the 8<sup>th</sup> of July, with 99% of all roadways cleared, 98% of all traffic signals operating properly and 98% of all electrical service restored.

The County initially opened 3 shelters; one for only 24 hours at Damascus High School, another at the White Oak Community Recreation Center and a third at Richard Montgomery High School. These shelters had varied census counts with a peak of 45 residents at White Oak and 140 residents at Richard Montgomery during this seven-day period.

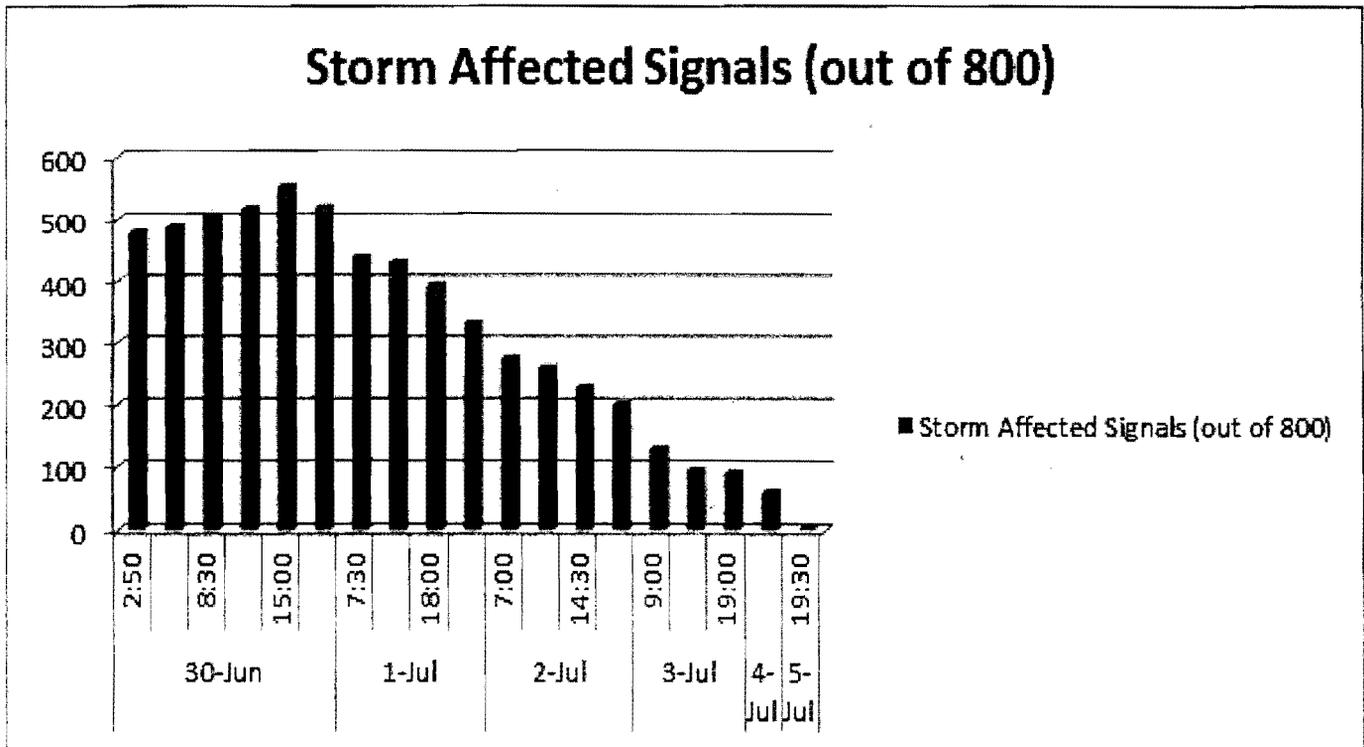
The Department of Environmental Protection, received over 80,000 tons of debris at the Shady Grove Waste Transfer Station from the beginning of the storm through July 13<sup>th</sup>.

**Table 1 – Number of Vehicle Drop Offs at the Waste Transfer Facility**

Date	Number of Vehicles Depositing Waste	
June 29	326	
June 30	1,998	
July 1	1,644	
July 2	1,650	
<b>July 3</b>	<b>4,279</b>	New Daily Record
July 4	619	
July 5	3,181	
July 6	2,477	
July 7	2,125	
July 8	977	
July 9	1,944	

The county government opened for business on Monday, July 2<sup>nd</sup> despite several facilities needing to remain closed as a result of power outages. In addition to 71 County facilities without power, the county also had 550 traffic signals without power, although that number would have been even high if not for emergency backup power systems at some intersections. While the backup power helped initially, these systems were designed as a short term solution that would provide 8 hours of backup power.

**Figure 5 – Montgomery County Signal Outages**



## Major Strengths

The major strengths identified during this activation are as follows:

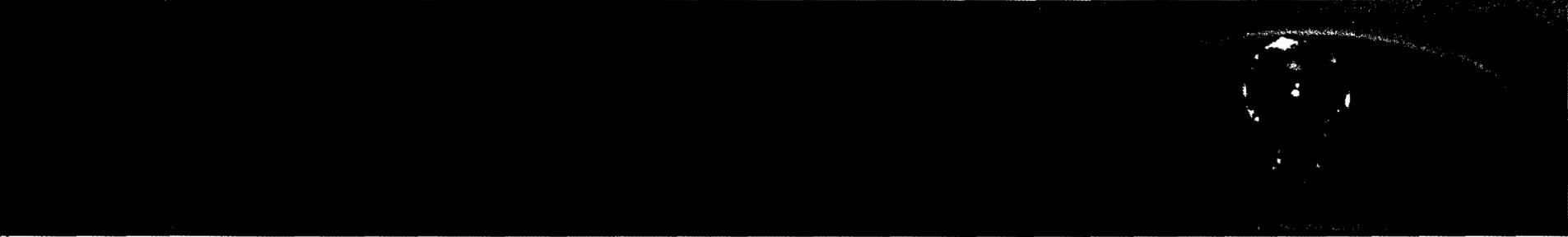
- Timely alert messaging to the public and County employees
- A strong sense of professional cooperation throughout all of the County's departments
- A very good understanding and implementation of emergency procedures by all County and partner agencies
- Activation of Continuity of Operations Plan (COOP) by the Department of Permitting Services

## Primary Areas for Improvement

Over the course of this event, several opportunities for improvement in Montgomery County's ability to respond to the incident were identified. The primary areas for improvement are as follows:

- Response Process: Items cited included improving the damage assessment process, expanding communications capabilities, developing strategy for priority one intersections and improving coordination with communication companies (Verizon, Comcast, RSN, AT&T, etc).
- Documentation: This section noted the need for establishing GIS capabilities and expanding the use of WebEOC.
- Redundancies: This section includes a discussion of generators, back-up systems and knowledge thereof.
- Continuity of Operations Plan (COOP): The need for more departments and agencies to review and exercise these plans in the future.

Overall, the response effort was considered successful and effective. Montgomery County's actions were timely and generally in line with procedural directives. The recommendations outlined in this document are meant to enhance the response efforts by making them more streamlined, cost-effective, and straightforward.



# WSSC's Response to the June 29, 2012 Derecho Storm Event

Prepared for Montgomery County Council T&E Committee  
Roger Berliner, Chair; Nancy Floreen; & Hans Riemer  
September 20, 2012

# Pre-Storm Conditions

- Temperature – High of 103 F°
- Water usage – high demand (206 million gallons of water produced).
- Electrical usage – PJM load curtailment was called.
- NWS forecast was for scattered storms. Forecast changed when the severe line of storms did not break up while crossing over the mountains.



# Pre-Storm Conditions

- 114 million gallons of a possible 174 million gallons of water in storage at time storm struck.
- Storm struck a time when storage levels had reached their lowest point of the day prior to refilling.



# Storm's Strikes WSSC

- Critical Facilities located in Montgomery County
  - Falls Road Water Pumping Station out at 10:22 pm.
  - Neelsville Water Pumping Station out at 10:24 pm.
  - Potomac Water Filtration Plant out at 10:30 pm.
  - Air Park Water Pumping Station out at 10:35 pm.
  - Wheaton Water Pumping Station out at 10:35 pm.

# Storm Progression

- Rocky Gorge Raw Water Pumping Station offline at 10:45 pm (Patuxent WFP offline).
- Unable to see many tank levels however limited data remained available. Staff periodically verified others which were not available.
- Power losses to control devices in Prince George's County's portion of the water system followed during the next hour as the storm tracked across the region.



# Status at Midnight

- Potomac WFP offline
- Patuxent WFP offline due to loss of power (BGE) at Rocky Gorge Raw Water pump station
- At midnight, over 50 facilities were without electrical power throughout Montgomery and Prince George's counties.

# Immediate Actions Taken

- Emergency response personnel called in.
- Contacted electric utilities. WSSC served by four: (Pepco, BGE, SMECO, Potomac Edison).
- Water supply valves to Howard and Charles counties were closed.
- Patuxent WFP continued pumping into the MC High Zone.

# Immediate Actions Taken

- Dispatched portable generator to Rocky Gorge WPS to open valves for water pumps in Hydro-turbine mode until BGE could restore power.
- Directed personnel to flow control devices in Prince George's County to stop uncontrolled flow to the lowest level water storage facilities.
- Placed small portable generators at several sites in MC to get level readings (batteries at several locations were running low).

# Information Exchanges

- Discussions with Pepco Operational Command Center for updates regarding location of trouble from electrical substation to Potomac WFP. Pepco determined that the Piney Meeting House feeder would be the quickest repair.
- Discussion with MC's EOC to get help clearing trees from roads so Pepco's crew could access down feeder lines.
- Discussion with Fire Departments in both counties about water storage levels and potential pressure problems. Requested that they call the Control Center if a fire occurred so water could possibly be moved to the problem area.



# Information Exchanges

- Discussion with BGE Command Center to restore power to Rocky Gorge Raw Water Pumping Station.
- MC opening the EOC and requested a WSSC representative present. WSSC staff arrived at the EOC by 3:30 am.
- Updates were given to Executive branch and EOC staff throughout the night.

# Intermediate Actions

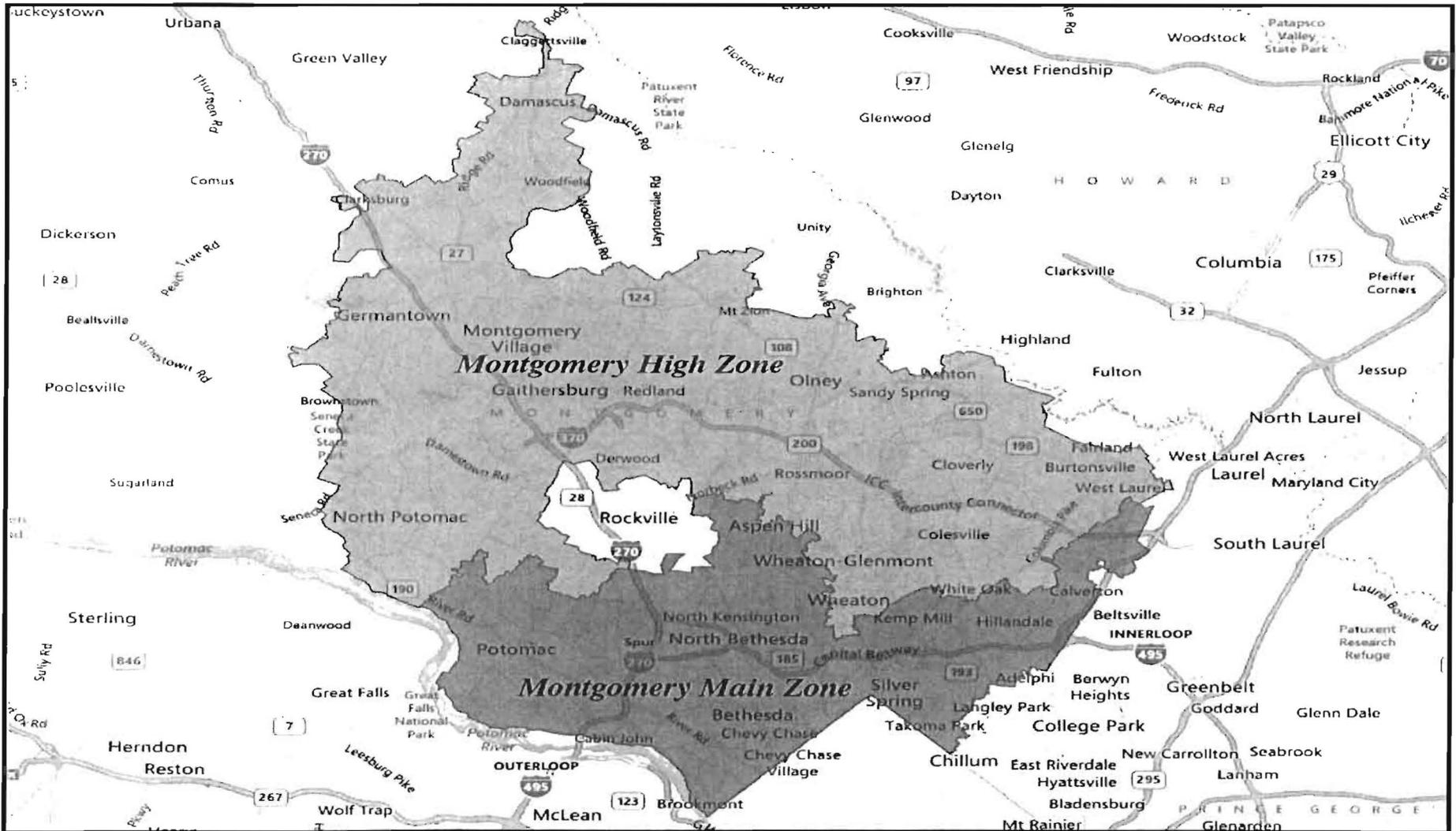
- Transferred water from Wheaton Reservoirs to Patuxent WFP via gravity so it could be pumped to MC High Zone.
- One turbine online at Rocky Gorge WPS on at 4:30 am. Patuxent WFP online. All High Zone pumps placed online from Patuxent (flow 18 mgd).



# Information Exchanges

- Discussion with Pepco started approx. 4:30-5:00 am regarding the need to have power back at Wheaton WPS following Potomac WFP.
- Pepco reports back that the Wheaton area has been hit hard. Every repair made by Pepco during the day, revealed another problem with the Wheaton feed.
- Discussions with Fire Department staff and EOC regarding status of water storage.

# High Zone vs. Main Zone



# Mandatory Water Restrictions

- Determined that mandatory water restrictions would be needed due to system levels and lack of power across the two counties (4:30-5:00 am).
- Press releases sent out for Mandatory Water Restrictions on June 30th at 6 am.
- BGE returned power to Rocky Gorge at 6:15 am. Patuxent WFP production increased to 70 mgd.



# Actions

- Electrical power returned to Potomac WFP at 9:15 am. Potomac WFP out of service 10 hours, 49 minutes.
- Plant started up at 9:30 am.
- Began pumping 30 mgd to MC High Zone at approx. 10 am. Flow was limited to a 36-inch main because the second feed (60-inch) to MC High Zone was out of service for repairs.

# Actions

- Potomac WFP quickly ramped up to 190 mgd.
- By late afternoon on June 30, storage was returning to normal except for MC High Zone.
- Discussions with Fire Department staff on system storage recovery.
- Pepco restores power to Wheaton WPS at 9:30 pm.

# Lifting of Water Restrictions

- Early on July 1<sup>st</sup>, Fire Department notified that MC High Zone was in good shape, but restrictions were staying in place for awhile longer to ensure that the water distribution system responded as expected.
- Water Restrictions were removed at noon on July 1<sup>st</sup>.



# WSSC's Assessment of PEPCO

- After the July 2010 storm/electrical outage, WSSC met with Pepco to inform staff of the importance of water supply to the region and the vitally important role Potomac WFP plays.
- After July 2010 storm, Pepco and BGE agreed to make water plants and related facilities their #1 priority.
- Given the amount of damage from the Derecho, Pepco responded extremely well to WSSC's outages.



# Following the July 2010 Storm Event

- Pepco trimmed many trees along both electrical supply routes to Potomac WFP.
- WSSC with the assistance of Pepco removed approximately 60 trees at Potomac WFP.
- WSSC WUERM was given direct phone access to Pepco Operational Center.



# Electrical Reliability at WSSC

- There is currently an electrical reliability study underway to look at all of WSSC's critical facilities. It is expected to be complete in June 2013.
- Commission has six mobile generators and are in the process of purchasing three additional mobile generators. These range in size from 450 KW to 40 KW which are capable of providing power to some our smaller facilities and ancillary equipment.
- It requires a minimum of 10 megawatts to run critical processes at Potomac WFP.



# Water System Reliability

- Acoustic Fiber Optic (AFO) monitoring of PCCP pipes.
- Designs are complete to upgrade Patuxent WFP from 70 to 113 mgd. Rocky Gorge Raw Water pump station upgrade, and design/construction of a fourth raw water main from the pump station to plant.



# Water System Reliability

- More storage to be constructed:
  - Laytonsville ET (500,000 gal), est. in service 2013
  - Clarksburg ET (750,000 gal), est. in service 2017
- Investigating potential for redundant pumping station to northern-most Montgomery County facilities.



# Distribution System Capabilities

- There are many variables that affect the ability to supply water for prolonged outages, including:
  - Length of electrical outage.
  - Location and size of OOS or broken water mains/transmission lines.
  - Water Treatment Plant shutdowns, repairs and/or upgrades.
  - Location and size of distribution facility OOS.
  - Systems Demand (time of year, time of day).
  - Customer adherence to Mandatory Water Restrictions.



# Potomac WFP Recent Power Outage Events

Mar. 2008 – Feb. 2010

Loss of single feeder only

Feb. 6, 2010

3 hours, 58 minutes

Jul. 25, 2010

13 hours, 35 minutes

Feb. 25, 2011

7 hours

Jun. 29, 2012

10 hours, 49 minutes



# Water Restriction Authority

- WSSC's General Manager has the right to issue voluntary or mandatory water restrictions to the entire Washington Suburban Sanitary District under Public Utilities Article §17-403 (formally known as Annotated Code of Maryland, Art. 29 §9-101).
- Primary enforcement will be vested with WSSC, local, and county police.



# Water Restrictions

- It is extremely helpful when the counties work with WSSC to distribute messages about water restrictions or boil water advisories.
- During the shutdown of the 96-inch main in July 2010, we saw a reduction of approximately 17%. While we hoped for more, all reductions helped to ensure that no one went without water.



# Information about Critical Facilities

- Fire Departments in both counties are notified electronically whenever fire hydrants are taken out of service. This includes water mains that contain fire hydrants.
- Transmission mains do not contain fire hydrants therefore notification does not normally take place when one is placed OOS unless it creates low pressure.



# Information about Critical Facilities

- WSSC Commissioners and county staff were informed at the June 20<sup>th</sup> Commission meeting of the large mains throughout the WSSC service district which were OOS for repairs. Included on the map was the 60-inch feed from Potomac WFP to the MC High Zone.
- Discussions have already taken place between MC EOC and WSSC staffs to hold planning meetings prior to the storm season to inform of any situations that may affect water supply.



# Final Thoughts

Even though mandatory water restrictions were enacted for 36 hours due to low system levels, no customers were without water or had to boil water.

