

Questions and Answers from County Councils and Staff
Re: WSSC Water Main Break on 6/15/08

Q: There have been conflicting reports on the age of the Montgomery County pipe that broke this week. One said it was built in 1950. Another said in 1970. Yet another said 1960. How old is this pipe and why did it break?

A: This particular pipe was contracted in 1968 and installed in 1970. The pipe was constructed of pre-stressed concrete, which was considered state of the art technology at the time. Many factors can cause pipes to fail and age is just one of them. Pipes can fail due to external soil conditions that can deteriorate the pipes from the outside. Pipes expand and contract when the ground freezes and unfreezes throughout the year and this can add stress to pipes. Electrical currents, weight above or around the pipes, and various other factors can contribute. In this particular case, due to the remote location of this pipe and the amount of water released for the length of time it was released, it may not be possible for WSSC to determine the exact cause. However, WSSC is continuing our commitment to due diligence and will continue our investigations to pursue any and all evidence available.

Q: Pressure zones are required to pump water from a lower to higher elevations as in this case. Does WSSC do risk assessments as part of asset management? If they do, do they look at more than just the age of the pipe or the number of breaks but other factors such the water pressure zones and those pipes under constant or high pressure and the number of people potentially impacted by a pressure zone break? In other words, what factors does WSSC consider in its risk assessment for aging repair, rehabilitation, and replacement decisions?

A: Specifically, the water main that broke on June 15, 2008 was a pre-stressed concrete cylinder pipe (PCCP). The WSSC PCCP Condition Assessment and Inspection Program examines several factors for risk assessments as part of asset management. These factors include but are not limited to: 1) land use factors such as proximity to existing structures, potential damage to existing structures and/or potential for flood damage; 2) operational needs such as supplying water service and water restriction issues; 3) known manufacturing defects such as wire class issues, manufacturing plant problems and steel cylinder problems; 4) repair history issues such as past joint leaks and/or pipe breaks; 5) inspection history issues such as date of last inspection, type of inspection, and repairs performed; and 6) diameter of pipe where larger pipes have higher risk. These factors and others (depending on the particular pipeline) are all considered as part of our large diameter transmission main asset management plan and prioritizing annual pipeline inspections and repair priorities.

At its highest level, asset management is a business model that drives utilities to make decisions in what to do and why, how to do it and when. It determines where to invest, what the costs will be, and what the return is. WSSC's Utility Wide Master Plan was created as such a model to provide input into the 10-year fiscal plan and

prepare a 30-year capital investment projection based on the following requirements: regulatory, capacity, maintenance, rehabilitation / replacement, process control, energy conservation, and reliability. WSSC's infrastructure was divided into 11 major asset groups and each group was further broken down in major areas. The following data was collected for each asset: installation date, maximum potential life, expected economic life, refurbishment and replacement cost, imminent failure mode, and remaining useful life of each asset was estimated. A priority list was created based on that data.

More detail on the WSSC Utility Wide Master Plan can be found in the Executive Summary on our website. <http://www.wsscwater.com/Utility-wideMasterPlanPhase1A-ExecutiveSummary.pdf>

Q: *What is the next pipe most likely to break in WSSC system in WSSC's estimation? Can this be predicated with any science or accuracy at all? If not, why?*

A: There are many factors that could cause a water main break including several different types of pipe materials and many different conditions under which a pipe is installed. This reality makes it virtually impossible and impractical for utilities and engineers to predict the location of the next pipe break with any accuracy. The factors could include water temperature, corrosive soil, corrosion of pipe, aged infrastructure, unknown pipe manufacturing defects, possible construction damage, third party damage following installation, soil and/or groundwater conditions, etc. The majority of the breaks that do occur in the WSSC system occur on the small diameter aged cast iron pipe. Breaks on large diameter PCCP water transmission mains similar to the one that occurred this week are rare.

To give an example, attempting to predict the next pipe to break is like the Department of Transportation or DPW attempting to predict the next road to get a pot hole. Too many factors within and outside of your control make this impossible with any true sense of accuracy. Imagine attempting to do the same prediction for buried assets like water mains.

Q: *What is the probability WSSC could accurately predicate the next pipe break 1 in 100, 1 in a 1000 or 1 in a million? Can this be done and if not why?*

A: As indicated in the question above, there is no practical way to accurately predict the next pipe break in any water distribution system, particularly a water distribution system as large and varied as WSSC's which includes over 5500 miles of water pipelines.

Q: *Is the \$45 million in the current reconstruction program addressing the pipe that broke in Montgomery County this Sunday? If not, why?*

- A:** This particular large diameter PCCP water transmission main was not on the list of pipes to be replaced. Funds from the WSSC FY '08 operating budget are being utilized to make the current repairs.

Pipe repairs are funded through WSSC's water operating funds. Pipe replacements are funded with capital funds. Condition Assessments, Risk Assessments, and priorities from the Utility Wide Master Plan drive the prioritization decisions regarding repairs, rehabilitation, and replacement.

WSSC has approximately 5,500 miles of fresh water pipeline, which is equivalent to 30 million feet of water pipes. WSSC has nearly 5,400 miles of sewer pipeline. It is neither economically feasible nor physically possible to inspect every foot of pipe. Instead, we must rely on industry best practices and known risk factors while maintaining our operations and capital needs for growth according to our currently approved budget approvals

WSSC is currently budgeted for 27 miles of water main replacement and 51 miles of sewer main replacement/rehabilitation in the capital program for FY 2009. The budgeted 27 miles of water mains for replacement includes small diameter (12-inches and below) cast iron mains, which are part of the distribution system and considered a high priority.

- Q:** *What was the life expectancy of this particular pipe that broke? What conditions other than age can impact pipes and cause them to fail?*

- A:** Typically there is a 100 year life expectancy for PCCP pipe. However, many factors can impact a pipe and cause it to fail in addition to age. These factors include pipe manufacturing defects, possible unknown damage during installation or transportation, unknown third party damage following installation such as construction impacts associated with adjacent development projects such as excavations in close proximity to the pipelines and impacts or loading caused by heavy construction equipment, and soil and/or groundwater conditions. Due to the remote location of this pipe and the amount of water released for the length of time it was released, it may not be possible for WSSC to determine the exact cause and seek damages from a manufacturer, installer, etc. This is an accepted risk throughout the water and wastewater industry, which maintains assets largely buried underground. However, WSSC is continuing our commitment to due diligence and will continue our investigations to pursue any and all evidence available.

- Q:** *Historically, what has been WSSC's approach to inspection and maintenance of infrastructure including pipes? Was this pipe inspected or repaired as part of any ongoing maintenance program? What is WSSC's current inspection and maintenance program and do we adhere to it?*

- A:** Years ago WSSC started a program to internally inspect all large PCCP pipe in our inventory. When decisions were made around 2000 to have zero rate increases for

consecutive years and the agency was down sized, much of this inspection program was turned over to contractors. Further contracting problems lead to WSSC leadership re-examining the inspection program and a decision was made two years ago to restart PCCP inspections with WSSC staff. This process involves shutting down and de-watering mains, inspecting the pipe and making any necessary repairs. The main must then be placed back in service.

Currently, WSSC has an annual goal to inspect and monitor 12 miles of large diameter PCCP transmission mains. We can only achieve this goal when the funding is approved and available. If WSSC received additional funding, additional mileage could be added to the inspection list.

The 48-inch PCCP main that broke recently has not been inspected since it was installed. WSSC has focused on larger diameter mains and other critical mains, which have been identified as a higher risk and higher priority. It is known in the industry that large diameter PCCP pipelines manufactured in the period from 1960 through early 1970 similar to the one that broke have a proven track record of reliability and do not have high break history.

Q: WSSC has identified the problem as “aging infrastructure.” Is it just age or are there other factors that contribute to pipe failures? If so, what are those factors?

A: Factors other than age that can impact pipes and cause them to fail could include water temperature, corrosive soil, corrosion of pipe, pipe manufacturing defects, possible unknown damage during installation or transportation, unknown third party damage following installation such as construction impacts associated with adjacent development projects such as excavations in close proximity to the pipelines and impacts or loading caused by heavy construction equipment, and soil and/or groundwater conditions.

Q: Was the pipe that broke this week in Montgomery County missed in a repair schedule or was it accounted for in the existing \$45 million dollar a year reconstruction program?

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Q: Is the solution to this problem really to fix all the pipes just based age?

A: No. It is known in the industry that large diameter PCCP pipelines manufactured in the period from 1960 through early 1970 similar to the one that broke have a proven track record of reliability and do not have high break history. The cause of the break

is considered an anomaly at this time until further investigation is done. Due to the remote location of this pipe and the amount of water released for the length of time it was released, it may not be possible for WSSC to determine the exact cause. However, WSSC is continuing our commitment to due diligence and will continue our investigations to pursue any and all evidence available.

Q: If WSSC had received the Renewal Infrastructure Fee in the FY 09 budget as originally presented during the public hearings, would the pipe in Montgomery County that broke this week have been replaced based on WSSC criteria? How long would this program have to be in place before this and other similar situation will be prevented?

A: No. The pipe that broke has had a proven record of reliability and it has not reached the end of its life cycle. The cause of the break is considered an anomaly at this time until further investigation is done. Due to the remote location of this pipe and the amount of water released for the length of time it was released, it may not be possible for WSSC to determine the exact cause. However, WSSC is continuing our commitment to due diligence and will continue our investigations to pursue any and all evidence available.

Q: How many water mains breaks occurred during the decade of the 1990? How many water main breaks have occurred from 2000 to the present?

A: WSSC experienced 12,472 water main breaks from 1990 to 1999. WSSC has experienced 11,412 water main breaks from 2000 to the present. A detailed spreadsheet with a year by year breakdown of water main breaks and leaks is attached.

Q: What will be the change in the number of breaks if WSSC spends \$1.8 billion to fix aging pipe from 2010 to 2020?

A: An aggressive pipe replacement program over time will change the number of water main breaks, however, without a detailed plan of the mileage, diameter, type, etc. of mains that would be included in such a program, it cannot be predicted at this time.

Q: Did WSSC have a communication plan to notify ratepayers of water emergencies? If so, what is that plan?

A: WSSC, along with many in our industry, has an evolving communications plan often complicated by factors we do not control. In the post September 11, 2001 world, all government agencies and particularly those identified as critical infrastructure have had to change modes of communications again. Faced with changing technology, economic realities, a public with varying communications desires and abilities, and legacy computer systems requiring a massive overhaul, WSSC has worked closely with officials in both Counties to coordinate emergency communications with the appropriate individuals within each County. In addition WSSC has excellent

relationships with the print, electronic and television media to get messages out as well. We also rely on our website to get information out to the public. WSSC is in the process of expanding our ability to communicate with ratepayers. See the next Q&A for further details.

Q: I have heard rumors that WSSC has been working on an automated system to provide alerts directly to ratepayers who opt in for notifications. Is that plan still in the works and when will it begin? How will the system work?

A: WSSC is currently working on an automated Customer Notification System (CNS) to provide alerts directly to ratepayers who opt in for notifications. The system is in the final stages of development. Testing and training will begin over the next two weeks.

The system will provide notifications to any individual interested in receiving the notifications, including ratepayers, staff, and any other interested individuals. Because of the important role the system will play, WSSC will launch CNS only after we feel comfortable that an appropriate number of staff have been properly trained. We will also be testing the system with both WSSC employees and selected ratepayers. More than four dozen staff members are currently slated to be trained on the system prior to its launch. A marketing plan to inform the public to sign up for the system will be implemented at the appropriate time.

Here is how the system will operate:

- Individuals will sign up for the system through WSSC's homepage and a dedicated Web page. On the registration page, individuals will be able to choose the types of messages they want to receive for their area such as information on water main breaks, WSSC-related traffic situations and/or WSSC community meetings. They will also be able to choose the way they want the message delivered (via e-mail and/or text).
- Individuals will NOT have to choose to receive information on emergencies like Boil Water Advisories. They will automatically receive those notifications when they sign up for CNS. The system is designed to supplement the current emergency procedures for situations like Boil Water Advisories. However traditional mass media like TV and radio, now including the web, remain the fastest way to reach the largest number of people.
- Individuals registering for the notifications will have the ability to enter in multiple addresses for their home, their work, their children's schools, etc. They will also be able to register for notifications to multiple e-mails, cell phones and SMS devices.

For notifications, WSSC staff will use the system to plot the location of a situation taking place and the approximate service area it affects. A corresponding message will be sent to customers who have signed up within the affected service area.

CNS is designed to provide a report of every notification sent by WSSC. Because of this, WSSC will be able to monitor its effectiveness on a regular basis.

At this time WSSC does not anticipate using the systems telephone capabilities. This is due to the belief that many people don't stay on the phone long enough to hear an automated message, believing that the call is coming from a telemarketer.

Q: Why doesn't WSSC already have such a system in place? What do other agencies in the region do regarding notifications?

A: As explained in a previous response, the industry communications and emergency notification plans are ever evolving, particularly in a post September 2001 world. WSSC works with authorities in both Montgomery and Prince George's Counties to coordinate with existing systems. We all recognize lessons learned from this experience and continue to explore areas where we may improve. WSSC is in the process of implementing an opt-in automated system to notify ratepayers. The Intergovernmental Relations Office will notify both County Councils when this system becomes available.

Fairfax Water Authority is in the process of installing a telephone notification system that they eventually plan to merge with GIS, which will allow them to notify customers in a more precise geographic area. In April, they had an incident that required mass notification and relied on the county's Reverse 911 system, which narrows the geographic area only by zip code. The notification took many hours. Fairfax Water has also partnered with the county to use their text /email system, which requires customer sign-up.

DC-WASA has a customer sign-up system. When an incident posts on the DC-WASA web site, it automatically goes to individuals who have signed up for email notification. DC-WASA also uses the city's emergency notification resources for phone, etc.

Prince William County Water Authority uses a GIS-linked out-dialing telephone system. They have the ability to call all customers in targeted areas. They also use text messaging, but not email notification.

Q: What is WSSC's plan should a homeland security type situation arise such as poison deliberately put in the drinking water? How would WSSC respond and how do we coordinate with other agencies and authorities?

A: Following the events of September 11, 2001 and the creation of the Department of Homeland Security, WSSC along with other water and wastewater utilities

throughout the nation were identified as critical infrastructure. As such, we were required to develop vulnerability assessments in response to various threats and risks. The U.S. Environmental Protection Agency (USEPA) took the lead to review and house the plans, as they have federal jurisdiction over water systems. Although not required by the DHS mandate, WSSC developed a water contamination response plan based on guidance in the USEPA's Response Protocol Toolbox and in coordination with appropriate local, state, and federal agencies. The plan has been in effect since the summer of 2006 and we continue to coordinate with local, state, and federal agencies. Both the vulnerability assessment and water contamination response plans are highly sensitive, confidential documents. WSSC is confident that we have the plans and people in place to respond to contamination threats to our water supply to protect the families and communities we serve in Prince George's and Montgomery Counties.

Q: What does WSSC say to those citizens who believe WSSC's response to the water main break, loss of water, and the need to boil water amounts to ineptitude and carelessness of the part of the agency?

A: We regret the great inconveniences this incident caused for all we serve, both residential and business. We understand these days were not easy. WSSC's paramount concern throughout this event was constant: the safety and well being of the customers. The WSSC Control Center acted immediately when at 9:15 pm monitors indicated there was a loss of water pressure in the system. Calls started to come in from individuals who had no water service or had low water pressure, but there were no reports of water streaming down the streets or shooting into the air. There was no visible sign of a water main break anywhere.

WSSC's Systems Control Group mobilized immediately and the group leader contacted the Montgomery County Fire Department to alert them that pressure was falling in certain areas. Staff was called in to launch a methodical search in remote areas. The Communications Office contacted the media. Stories about a potential massive outage were on the 11:00 pm news. Radio stations carried the story as well.

WSSC contacted the Maryland Department of Environment and was told that if pressure continued to drop, MDE might recommend a Boil Water Advisory by morning.

The break, as we now know, was located around 4:30 am Monday morning near Lake Bernard Frank in the Derwood area. It is a remote area used for recreation and not likely to be frequented by people on a Sunday night. The water was simply flowing into the lake. It was not flooding streets, homes or businesses. At that time of night, it was not likely to be seen by anyone.

By this time the pressure was so low in the system that MDE ordered a Boil Water Advisory. However, at this point in the timeline, there was no way to accurately delineate geographically specifically who was affected by this incident. Therefore,

the decision was made to err on the side of caution and include a larger area than that which may actually be affected. WSSC is committed to provide safe, reliable water to our customers. We understand the disruption in service was an inconvenience to those we serve. However, WSSC needed to take all necessary precautions to ensure the health and safety of everyone who uses our water. We made the prudent choice regarding the affected area and based on fixed boundaries that were easy to communicate.

The Communications staff implemented a comprehensive outreach plan. A pre-prepared template news release was refined and released to the media in time for the morning news cycle. There was widespread coverage on every television and radio news outlet. Media outlets uploaded the information on their websites. This continued throughout the morning and throughout the day. Information was also posted on the WSSC web site.

By 2:30 pm WSSC uploaded a map to give people a visual representation of the area affected by the Boil Water Advisory. While this map was not a perfect image and led to initial confusion for those at the borders of the affected area, creating a map of this scope and following our distribution system that differs from a street map proved tedious. Listening to the concerns from citizens and elected officials, WSSC erred on the side of caution and created a second map. This second map, a Google interactive map, was more exact and was posted as soon as it became available. By Thursday afternoon, the map had more than 155,000 hits.

At the onset of this water main break WSSC committed that once we found the break and closed it off, we would be able to fully restore service within 72 hours. Water pressure was restored in less than 24 hours to the majority of the affected area and MDE lifted the Boil Water Advisory 66 hours later.

We believe that, in conjunction with MDE, WSSC responded quickly, effectively and responsibly in the best interest of public health and safety.