

DON'T GIVE ME A BREAK

WATER DISTRIBUTION PROBLEMS IN THE CITY OF SAN DIEGO

SUMMARY

While much attention has been focused recently on current and impending water shortages in the State of California, County of San Diego, and the City of San Diego (City), there are also continuing problems facing the pipeline distribution of the City's existing water supplies. The 2013-2014 San Diego County Grand Jury (Grand Jury), motivated by the frequent disruptions of service in the City resulting from water main breaks and fire hydrant knock overs, has investigated both the San Diego Public Utilities Department (SDPUD) procedures for handling water service interruptions and its plans to minimize such problems in the future.

Our investigation revealed inadequate communication within the SDPUD, insufficiently equipped SDPUD emergency response personnel, and a failure of the City to recognize and alert the citizens to the urgency of future water main replacement. Most of the old cast iron mains have been replaced, but the City is now facing the prospect of over 2,100 miles of asbestos cement pipe reaching the end of its predicted service life, a problem which potentially dwarfs the remaining cast iron problem.

INTRODUCTION

Every break in the water distribution system results in costs to businesses and residents in the affected area, as well as potentially significant liability for the City and water ratepayers to compensate for damage done, in some cases hundreds of thousand dollars. As such, it behooves the City to shut off the water in the affected area as quickly as possible in order to minimize the damages. It quickly became clear to the Grand Jury that there are steps the SDPUD could take to shorten the shut down time and hence minimize the consequent damages.

Many citizens believe that as the City replaces its old cast iron (CI) pipes, water main breakage will become a diminishing problem. While the City is currently using Polyvinyl Chloride (PVC) pipes for most repairs and new installations, there were several decades in the mid-twentieth century when asbestos cement (AC) was the pipe of choice. Much of this pipe is now reaching the end of its predicted service life, so rather than diminishing, pipe breakage may actually begin accelerating.

PROCEDURE

The Grand Jury interviewed representatives from three of the five divisions of the SDPUD. To better understand the problems faced by the department, the Grand Jury interviewed both management and field service personnel. The Grand Jury also looked at

published literature detailing what San Diego and other cities have done or are proposing, as well as technical papers on projected durability and lifetime of AC mains.

DISCUSSION

Emergency Services (ES) is a group of first responders within the Water Construction & Maintenance division of the SDPUD. They are the first to respond to all reports of water improperly flowing anywhere within the City. Problems can be as minor as broken sprinklers or as major as water main breaks. These issues are attended to by ES personnel dispatched during most hours from four locations within the City. When a water main breaks, ES first responders are usually the people who turn off the water. ES personnel also respond to all hydrant knock overs, but are frequently preceded to the scene by San Diego Fire Department (SDFD) personnel who sometimes also turn off the water.

First responders are governed both by state regulations and local practices. State regulations are outlined in the California Department of Public Health (CDPH) document “California Regulations Related to Drinking Water”.¹ CDPH regulations for water distribution systems are also, by design, consistent with federal guidelines. According to section 63750.45 of the CDPH regulations, anyone who maintains or operates any portion of a water distribution system is considered a “distribution operator.” Section 63750.50 (b) provides “Water systems shall utilize only certified distribution operators to make decisions addressing shutdown, repair, disinfect and test broken water mains.”

The Grand Jury knows of multiple first responders who are not State certified. This can easily be verified because the CDPH maintains a list of certified water distribution operators.² The City Civil Service Commission minimum qualifications for a Water Distribution Operator³ include “Possession of a valid Grade II Water Distribution Operator Water Treatment Operator certificate or equivalent issued by the American Water Works Association.” While the Grand Jury has not determined whether those not certified by the State are certified by the Water Works Association, it seems clear that such certification is not in compliance with CDPH regulations. It is not clear to the Grand Jury whether shutting down water to a hydrant in all cases technically constitutes shutting down a water main, but it is doubtful that many, if any, SDFD personnel are state certified as Water Distribution Operators.

SDPUD provides each first responder with a current copy of the Thomas Brothers Guide to find their way to reported water emergencies. Some responders use GPS devices, but these are purchased by the responders with their own funds and are not reimbursed by

¹ California Regulations Related to Drinking Water

<http://www.cdph.ca.gov/certlic/drinkingwater/Documents/Lawbook/dwregulations-2013-07-01.pdf>

² <http://www.cdph.ca.gov/certlic/occupations/Pages/DWopcert.aspx>

³ <http://www.sandiego.gov/empopp/pdf/classspecs/Water-Distribution-Oper.pdf>

SDPUD. Precious extra time may be spent by those relying on the Thomas Brothers to find the location in the Guide as well as the best route from their current location. One source within SDPUD told the Grand Jury, “It’s ludicrous that they actually use Thomas Brothers to find their way.”

Once the responder arrives at a break, his first task is to locate the appropriate valve to shut off the water. To minimize impact on nearby businesses and residences, the ideal valve is the one closest upstream of the break. What resources does the responder have to locate this valve? The primary resource is a paper document, which by all accounts is large and unwieldy, and is issued by the Asset Management group of the SDPUD. It is called the Water Field Book. It nominally shows the location of all mains and valves in the City water distribution system.

When corrections or additions are made to the Water Field Book, it can take several years before they are published. The latest version was printed in the fall of 2013, but there appears to be no policy for how frequently revised editions should be published, nor is there any requirement that first responders trade their old copies for new ones when a new revision is published. Some continue to use old editions because they have made hand written corrections to their own copies and do not want to lose these additions. Further, if they do turn in their old annotated copies, no one in the mapping section checks for such annotations so the corrections are lost. The edition prior to the fall 2013 edition was at least three years old, so those continuing to use old editions may be lacking necessary updated information upon arrival at an emergency.

As stated above, the Water Field Book is maintained by the Asset Management group. This group actively maintains a digital library of all pipe and valve locations in a computer system call SPLASH. SPLASH is continuously updated as new information comes in, though changes may take up to a month from receipt by Asset Management to inclusion in SPLASH. Much of this information comes from “As Built” notices posted on a City Engineering and Capital Projects “SharePoint” which Asset Management monitors on a monthly basis. However, since there is no procedure in place to automatically notify them of such changes, they can easily be missed. Even when Asset Management sees that changes have been made (probably the majority of the time) they do not send anyone out in the field to confirm these changes. It is also likely that not all “As Built” notice accurately reflect what was actually built.

In addition to the online SPLASH system and the paper Water Field Books, Asset Management makes available a comprehensive set of CDs containing all the SPLASH information in the form of PDF files. New CDs are issued approximately every 6 months.

First responders carry Water Field Books in their trucks. They do not have computer access in the field. In fact, they do not have computers. At best, a computer would allow an emergency responder online access to the latest information on the water distribution

system. If for some reason (e.g., no wireless connectivity) online access is not available, the responder would at least have access to fairly recent CD versions of the SPLASH data base.

When a first responder cannot locate a shut-off valve, either because the system has changed since his Water Field Book was updated or the valve cover has been paved over, his first response is usually to see if a supervisor is available with access to updated information, i.e., access to SPLASH. In those cases when a supervisor cannot be reached, the first responder simply moves to the next valve upstream. The inability to locate a valve is not routinely reported to Asset Management. Even if it were, it might be several years before the printed documentation which field crews depend on would be updated.

The City has four emergency crews available during daytime and evening hours stationed at different locations around the City. Overnight, there are only two crews available, one for the north half of the City and one for the southern half. However, water mains do not respect the clock so response times in the far reaches of the city have to suffer.

SDPUD maintains a goal of shutting down main breaks within 30 minutes of receiving a break report. After each incident the first responder fills out a Water Shutdown Report and the repair crew files a “Water Break/Leak/Discharge Report”. Examination of these forms for 2013 and 2014 indicates that both of these forms, while signed by both the individual responder and his/her supervisor, are frequently filled out incompletely and often contain contradictory information. For example, the Grand Jury found some reports indicating that water had been shut off before a break had been reported. SDPUD does not track actual response times, nor do they appear to maintain sufficient documentation to allow them to accurately measure their performance. Setting announced goals seems like good public relations but without measuring performance against those goals is of little actual value.

According to inewssource.org⁴, over the eight years prior to their report, “San Diego has paid out at least \$10 million to settle claims and pay contractors for repairs to private property that was damaged by water main breaks.” The Grand Jury has not been able to verify that figure but has no doubt that claims have been significant. It should be noted that this money does not come from the City general fund. It comes directly from the ratepayers. Given the cost to reimburse both businesses and homeowners for damages due to water main breaks, it is clearly in the best interest of the ratepayers (i.e., anyone paying a water bill) to minimize both the response time when a break occurs and the likelihood of future breaks.

⁴ to inewssource.org, Feb 27, 2012 (<http://inewssource.org/2012/02/27/cost-of-main-breaks-water-loss-add-up-for-city/>),

The previous discussion outlines weaknesses in the response system to breaks as they occur today. What does the future look like? Much of the public believes that most of the break problem will go away when the City finally eliminates all its old cast iron (CI) pipes, some of which are over a century old. Replacement of the last of these pipes is due by 2017. As of this writing, fewer than 80 miles of CI remain. A much bigger problem is that the City is rapidly moving towards the end of the predicted service life of some 2,120 miles of asbestos cement (AC) pipe. Even today, while breaks from CI pipes are diminishing annually, breaks from AC are accelerating.

According to interviews with SDPUD personnel, in 2013 there were 89 water main breaks in the City, mostly attributed to the aging and resultant wear on the water mains. Roughly half occurred in the rapidly diminishing number of CI distribution pipes. The remainder occurred in AC pipes. The City stopped installing CI pipes in the 1940's; instead using AC. AC was then the accepted standard for water mains across the United States. PVC was not yet available and the health hazards of asbestos were not yet known. By the mid 1980's, AC fell out of favor because of asbestos legislation and the difficulties of disposing of broken AC mains. (There is no known health hazard associated with AC pipes; the asbestos in the pipes is considered stable, though broken pipe fragments can pose an asbestos health hazard.) Since then, almost all new transmission pipes (pipes which carry water to a district) and all new distribution pipes (pipes which carry water to the end user), as well as most repairs to old pipes, are PVC.

The State of California Department of Public Health has mandated that cities replace at least 10 miles of CI pipe per year, with the goal of eliminating all CI pipe by 2017. The City is currently replacing in excess of 20 miles per year. With fewer than 80 miles remaining, the City is on target to meet the 2017 goal.

As a result of the shift from CI pipes to AC, the City currently has some 2,120 miles of AC pipe in place. These pipes are anywhere from 30 to 70 years old. According to a recent report on AC pipe prepared for the SDPUD⁵, "AC pipes are typically expected to have a service life of more than 70 years." The Grand Jury has found references that cap the service life at 70 years⁶, and others which claim as much as 100 years.⁷ Still, the City may be on the verge of a piping crisis which could easily dwarf the much more publicized, widely acknowledged problems with CI mains. AC service life depends heavily on water quality, surrounding soil type, and climate, so lifetime estimates vary. Clearly the fact that the number of AC breaks is accelerating indicates that conditions in the City do not favor the longer service life predictions. There is no mandate, either from the State or the City, to replace these 2,120 miles with PVC, nor is there yet a plan or financing in place to do so.

⁵ "City of San Diego Public Utilities Department; Asbestos Cement Water Main Replacement Program; Master Plan (H125808)", HDR/Schiff, January 2014

⁶ http://www.exponent.com/asbestos_cement_pipe_water_distribution

⁷ http://www.waterrf.org/ExecutiveSummaryLibrary/4093_ProjectSummary.pdf

The previously referenced SDPUD report on AC pipe⁸ is a general history and status of AC pipe and is not restricted to San Diego. Such a report is a necessary first step towards fixing San Diego's AC problem. It verifies to anyone who reads it that the main replacement program cannot end when the entire CI pipe has been replaced.

FACTS AND FINIDNGS

Fact: The first responders to all reports of water main breaks and hydrant knock-overs are members of the Emergency Services group of the San Diego Public Utilities Department

Fact: In some instances, the water supply to knocked-over hydrants is turned off by SDFD, not SDPUD, personnel.

Fact: California Department of Health regulations require that anyone turning off a water main be state certified.

Finding 01: Not all SDPUD first responders are state certified.

Fact: The only map the SDPUD supplies its personnel is the Thomas Brothers Guide.

Fact: The Thomas Brothers Guide provides no routing information.

Fact: GPS devices are readily available, relatively low cost, and generally provide the best routing information to any point in the city.

Fact: Emergency Service personnel who wish to use a GPS device must expend their own funds to purchase one.

Finding 02: Emergency Service personnel could frequently get to a disruption of service faster if they possessed department supplied GPS devices.

Fact: SDPUD first responders rely on a paper copy of the Water Field Book to locate valves.

Fact: Updated editions of the Water Field Book are not published on a regular basis.

Fact: Water Field Books used by some first responders are several years out of date.

Fact: Up to date information on pipe and valve location is maintained by SDPUD in a computer data base called SPLASH.

⁸ "City of San Diego Public Utilities Department; Asbestos Cement Water Main Replacement Program; Master Plan (H125808)", HDR/Schiff, January 2014

Finding 03: First responders do not have access to the most up to date information, which may slow response time.

Fact: SDPUD has a goal of shutting down all breaks within 30 minutes of a report.

Fact: SDPUD does not record enough information to determine actual response times, and some of the information it does have is demonstrably inaccurate.

Finding 04: SDPUD is not able to adequately judge its performance with its current record keeping process.

Fact: The City has fewer than 80 miles of remaining Cast Iron pipes.

Finding 05: SDPUD is on track to eliminate all remaining Cast Iron pipes. In fact, they are ahead of schedule.

Fact: The City has approximately 2,120 miles of remaining asbestos cement pipe.

Fact: The City stopped installing asbestos cement pipe approximately 30 years ago.

Fact: At a replacement rate of 40 miles/year (far exceeding the current replacement capacity), it would take 53 years to replace the remaining asbestos cement pipe.

Finding 06: In the unlikely event that SDPUD accomplishes a 40 miles/year replacement rate, replacement of even the newest asbestos cement pipe will be scheduled significantly beyond the end of its predicted service life.

Fact: AC pipe is currently being replaced strictly on an emergency (i.e., break) basis.

Fact: SDPUD is in a very early stage of planning for AC pipe replacement. They have authorized and received a report on the history and potential problems of AC pipe.

Finding 07: SDPUD needs to aggressively speed up its planning for AC pipe replacement.

RECOMMENDATIONS

The 2013/2014 San Diego County Grand Jury recommends that the Mayor of the City of San Diego direct the San Diego Public Utilities Department to:

14-52: Institute a program to ensure that all water distribution operators are state certified, paying for training if necessary.

14-53: Equip all water emergency response vehicles with GPS devices.

- 14-54: Equip all emergency first responders with computers and online access to the SPLASH system.**
- 14-55: Replace paper break reports with a modern computer based reporting system, thereby facilitating tracking problems and trends.**
- 14-56: Verify that any water distribution infrastructure on “As Built” drawings is, in fact, as built.**
- 14-57: Inspect all street repaving and resurfacing projects upon completion to assure that no valves have been paved over.**
- 14-58: Accelerate the replacement of asbestos cement water mains with PVC.**
- 14-59: Begin alerting the ratepayers to the probable impact of the asbestos cement water main replacement program on water rates.**
- 14-60: Request an independent performance audit by the San Diego City Auditor.**

REQUIREMENT AND INSTRUCTIONS

The California Penal Code §933(c) requires any public agency which the Grand Jury has reviewed, and about which it has issued a final report, to comment to the Presiding Judge of the Superior Court on the findings and recommendations pertaining to matters under the control of the agency. Such comment shall be made no later than 90 days after the Grand Jury publishes its report (filed with the Clerk of the Court); except that in the case of a report containing findings and recommendations pertaining to a department or agency headed by an elected County official (e.g. District Attorney, Sheriff, etc.), such comment shall be made within 60 days to the Presiding Judge with an information copy sent to the Board of Supervisors.

Furthermore, California Penal Code §933.05(a), (b), (c), details, as follows, the manner in which such comment(s) are to be made:

- (a) As to each grand jury finding, the responding person or entity shall indicate one of the following:
- (1) The respondent agrees with the finding
 - (2) The respondent disagrees wholly or partially with the finding, in which case the response shall specify the portion of the finding that is disputed and shall include an explanation of the reasons therefor.
- (b) As to each grand jury recommendation, the responding person or entity shall report one of the following actions:
- (1) The recommendation has been implemented, with a summary regarding the implemented action.
 - (2) The recommendation has not yet been implemented, but will be implemented in the future, with a time frame for implementation.

(3) The recommendation requires further analysis, with an explanation and the scope and parameters of an analysis or study, and a time frame for the matter to be prepared for discussion by the officer or head of the agency or department being investigated or reviewed, including the governing body of the public agency when applicable. This time frame shall not exceed six months from the date of publication of the grand jury report.

(4) The recommendation will not be implemented because it is not warranted or is not reasonable, with an explanation therefor.

(c) If a finding or recommendation of the grand jury addresses budgetary or personnel matters of a county agency or department headed by an elected officer, both the agency or department head and the Board of Supervisors shall respond if requested by the grand jury, but the response of the Board of Supervisors shall address only those budgetary or personnel matters over which it has some decision making authority. The response of the elected agency or department head shall address all aspects of the findings or recommendations affecting his or her agency or department.

Comments to the Presiding Judge of the Superior Court in compliance with Penal Code §933.05 are required from:

<u>Responding Agency</u>	<u>Recommendations</u>	<u>Due Date</u>
Mayor, City of San Diego	14-52 through 14-60	08/13/14

Filed: May 15, 2014