December 21, 2016

To: Commissioner-in-charge Steve Novick
Mayor Charlie Hales
Commissioner Nick Fish
Commissioner Amanda Fritz
Commissioner Dan Saltzman

CC: Mayor-elect Ted Wheeler
Commissioner-elect Chloe Eudaly
Director Lisa Turley, Bureau of Emergency Communications

OMBUDSMAN REPORT: PROBLEM WITH CITY'S EMERGENCY COMMUNICATIONS SYSTEM

This report is issued pursuant to the Ombudsman's powers and duties under City Code Chapter 3.77. The Bureau of Emergency Communications submitted a brief statement in response that is included as part of this report.

Summary

In May 2016, a house fire in Southeast Portland resulted in the death of an elderly woman. The Ombudsman's Office received a complaint alleging that the City took too long to respond to the fire. Although the allegations in the complaint were not substantiated, the Ombudsman's investigation uncovered a problem with the City's 9-1-1 system.

For more than a decade, the City's emergency communications system has unintentionally lost important information about a subset of emergency calls, preventing operators from following City policy and causing underreporting of call hold times and abandoned call rates. In 2015 alone, the number of affected calls totaled 18,482. The problem occurs when a cell phone caller hangs up or is disconnected while waiting to speak with a 9-1-1 operator. Under City policy, these calls are supposed to receive a return call to determine whether an emergency exists. However, the system does not retain the callers' phone numbers and does not apprise operators that the call occurred.

The lost information is the result of a screening system, known as the Reno Solution, that is designed to reduce the volume of accidental cell phone calls to 9-1-1.[1] The Reno Solution has reduced cell phone call volume. But the Reno Solution's interaction with the existing

[1] The screening system is also referred to as the "XMU+."

emergency communications system created a new, unintended problem: the inability to call back tens of thousands of people who are presumed to have dialed 9-1-1 on purpose.

Providentially, a State-funded phone system upgrade planned for Spring 2017 has the potential to resolve the problem. The upgrade includes an integrated screening system that will replace the Reno Solution. The new system promises to preserve the call back information for all intentional phone calls so that 9-1-1 operators can return calls that are currently disappearing from the call records.

Before accepting funding from the State and implementing the planned upgrade, the Bureau of Emergency Communications should seek City Council's approval. Council did not have an opportunity to vet and approve the Reno Solution when it was first implemented more than a decade ago. Going forward, Council should have the opportunity to consider the inherent risks and trade-offs associated with using a screening system and make sure that there will not be collateral damage to other parts of the system.

Background

AT&T first made the number sequence "9-1-1" available for calling emergency services in 1965, but it was not until 1999 that the United States Congress made 9-1-1 the universal emergency number for all telephone services. In doing so, Congress proclaimed that our Nation's public safety requires a seamless, ubiquitous and reliable end-to-end emergency communications system.

Responsibility for producing a seamless and reliable emergency communications system is shared between federal, state and local governments. The Federal Communications Commission (FCC) issues uniform, national rules to protect the quality and reliability of 9-1-1 service in the face of ever-evolving communications technologies. In Oregon, the Office of Emergency Management oversees the statewide 9-1-1 system and regulates the equipment used to process emergency calls. The Bureau of Emergency Communications (Bureau) operates the City of Portland's 9-1-1 Center, serving residents and emergency response agencies in Multnomah County.

All three levels of government have grappled with the technical and operational challenges that cell phones pose for the emergency communications system. Among the challenges have been a lack of information about the caller's location and call back number, as well as high volumes of accidental calls. For its part, the FCC adopted rules requiring cell phone service providers, such as Verizon and T-Mobile, to convey the caller's number and approximate location to 9-1-1 centers.

The FCC has not adopted rules to address the high volumes of accidental cell phone calls. In the absence of federal rules, state and local jurisdictions tend to rely on public education campaigns to reduce the incidences of accidentally dialing 9-1-1. Several jurisdictions have gone further, using automated systems to screen out unintended phone calls. However, this

approach has been in the minority in part because of concerns about screening out true emergency calls, according to the global sales manager of Interalia, a manufacturer of automated screening systems. In Oregon, automated screening systems are permitted as an exception to the Office of Emergency Management's requirement that a live operator must answer all emergency calls.

In 2004, the Bureau sought a variance and funding from the Office of Emergency Management to pilot a new screening technology. The Bureau highlighted Reno, Nevada's use of the technology, indicating Reno's 9-1-1 Center had not experienced any problems and that cell phone call volume was down significantly. It is believed that the Office of Emergency Management vetted the so-called "Reno Solution" prior to issuing a variance; however, apart from a November 2009 letter clarifying the previously issued variance, the Office of Emergency Management could not produce any supporting documentation regarding its vetting process, because any relevant records were past the date of retention under public records law.

At the local level, the Bureau sought approval to use the Reno Solution from its User Board, which includes representatives from first responder agencies. It did not seek approval from City Council. Instead, it notified the City's elected officials via email a few weeks before the Reno Solution went live.

In that same email and in a press release, the Bureau's director promised to report the findings of the pilot project to the Portland City Council in February 2005. According to the User Board's February 2005 minutes, the User Board "endorsed the continuation of the system. [The Director] will take the endorsement to the Council and get approval to permanently use the [Reno Solution]." There is no evidence that the Bureau ever sought Council approval to permanently use the Reno Solution. The Reno Solution has been in use ever since.

The Reno Solution works by routing all cell phone calls to 9-1-1 through an automated attendant. Callers hear a short message prompting them to say "9-1-1" or press any number. If a caller responds to the prompts, they are routed to a 9-1-1 operator. When there are no available operators, callers are placed on hold in the emergency queue. As operators become available, calls on hold are answered in the order they were received.

The Reno Solution has been successful in screening out cell phone calls. At the time of its implementation in December 2004, the Bureau reported that the Reno Solution immediately caused the average number of cell phone calls per day to drop from 580 to 184. Fast forward to 2015 and the Reno Solution screened out 26 percent of cell phone calls, totaling 124,649 for the year.

Problem: Missing Information

A latent problem with the Reno Solution came to light because of a May 2016 complaint to the Ombudsman's Office. The complaint alleged that the City took too long to respond to a residential house fire that resulted in a fatality. Allegations in the complaint were not

substantiated.[2] However, statements from neighbors that they had tried but were unable to reach 9-1-1 operators merited further inquiry.

One neighbor made it through the Reno Solution's prompts, waited on hold, but gave up before speaking with an operator. In the past, she said, 9-1-1 would have called her back. This time no one did. When asked about her call, the Bureau said it had no record of any calls from her phone on the date of the fire. The neighbor checked with her cell phone company and was able to obtain proof of her call to 9-1-1 that night. Dispatching responders to the house fire would not have occurred earlier had her call been answered or returned, but proof of its existence revealed that the Bureau had a problem.

Under the City's current emergency communications system, calls are treated differently depending on the device used to place the call. Calls from landlines and Voice over Internet Protocol (VoIP) bypass the Reno Solution and are answered by an operator or placed on hold in the emergency queue. Cell phone calls are routed through the Reno Solution. Only after a caller has responded to the Reno Solution's prompts will the call be answered by a 9-1-1 operator or placed on hold if no one is available.

While callers of any source are holding, operators are presented with real time information on a reader board indicating how many calls are on hold and the current hold time.

If a caller using a landline or the internet hangs up or is disconnected while waiting on hold, the system preserves the number and an operator generally returns the call to determine whether an emergency exists, in accordance with City policy. By contrast, if a cell phone caller hangs up or is disconnected, the number drops off the reader board and vanishes. The call essentially disappears through a crack in the phone system, making it look like it never happened. That is what happened to the neighbor who tried to alert 9-1-1 about the house fire but hung up while she was on hold.

Although the City is unable to recover vital information about the disappearing calls, such as the call back number, City technology staff was able to quantify the number of affected calls. In 2015 alone, that number was 18,482.

A system in which vital information about thousands upon thousands of intentional emergency calls disappears undermines federal and state rules designed to ensure a seamless and reliable emergency communications system. Whereas federal rules require cell phone service providers

[2] The complainant theorized that the delayed response was due to the Portland Fire & Rescue Bureau assigning too many resources to an earlier commercial fire, leaving it ill-equipped to respond to the subsequent residential fire. This theory was not borne out by the facts. The Fire Bureau arrived at the location within 4 minutes of being dispatched, well under the City's goal of responding to calls within 5 minutes and 20 seconds.

to convey call back information to the Bureau, and state rules require the Bureau to maintain equipment capable of accepting call back information, the Reno Solution disrupts the conveyance, resulting in the loss of that information. Whereas state rules say that all emergency calls must be answered by a live person, because of communication problems between the Reno Solution and the rest of the Bureau's phone system, potentially thousands of presumptively intentional emergency calls each year since 2004 were neither answered nor called back.

Further, this subset of emergency calls is not reflected in the Bureau's reporting on how long callers remain on hold and abandoned call rates. By underreporting on these measures during the budget process, the Bureau has provided City Council with an inaccurate depiction of the extent to which the Bureau's chronic staffing crisis may be jeopardizing public safety.

Solution: System Upgrade

The City's technology staff says there is no fix available under the current phone system configuration, short of deactivating the Reno Solution and routing all cell phone calls directly to operators. The Bureau is opposed to removing the Reno Solution because, despite advancements in cell phone technologies in the last decade, the volume of accidental calls remains high.

Using the Bureau's 2015 numbers, if the City removed the Reno Solution, the Bureau would have handled an additional 124,649 cell phone calls last year, or about 342 more calls per day. Assuming each call lasts at least three minutes, the Bureau would have needed to absorb more than 17 hours of additional work each day. This would be difficult to do under current staffing conditions. For years, the Bureau has reported that it is unable to keep up with increasing call volumes. Chronic staffing shortages have led to the use of forced overtime, and operators are leaving faster than the Bureau can replace them. As such, deactivating the Reno Solution appears untenable.

Continuing the status quo is likewise untenable. Fortunately, a fix appears to be on the horizon. A previously scheduled phone upgrade is planned for April or May of 2017. The upgrade will replace much of the Bureau's patchwork of communications hardware and software with a new, integrated system. The new system includes internal screening software that would replace the Reno Solution hardware. Technology staff confirmed that the new system will be able to keep track of emergency cell phone calls that are abandoned or disconnected while in the 9-1-1 queue. Specifically, the new system can be configured to present those calls to the operators as incomplete and provide a phone number for the operators to place a return call. Technology staff say they will also be able to include these calls in the Bureau's statistical reporting, making reports about the Bureau's performance and staffing needs more accurate.

Calling back abandoned or disconnected cell phone calls will result in a modest workload increase for operators. In 2015, the Bureau's operators handled 846,362 emergency and non-emergency calls. During that same time period, 18,482 cell phone calls to 9-1-1 were

abandoned or disconnected while in the emergency queue. Including those abandoned or disconnected calls in the total call volume would represent a workload increase of 2.2 percent. Stated differently, it would mean an increase of 51 calls per day. Assuming each call lasts at least three minutes, the Bureau would need to absorb around 2.6 hours of additional work each day.

Recommendations

In response to the Ombudsman's recommendations, the Bureau has already taken two interim steps to mitigate current risks. The Bureau revised the message callers hear while waiting on hold in the 9-1-1 queue. The new message cautions callers to not hang up "as we may not be able to locate you or call you back." The Bureau has also conducted community outreach by putting out information on social media forums, such as NextDoor.

The Bureau should take one other immediate step. It should formally notify the Bureau's User Board and other 9-1-1 centers that use the Reno Solution about its interoperability problems and its potential to cause emergency call records to disappear.

Moving forward, even though the State of Oregon has approved and is funding the City's phone upgrade, the Bureau should still seek City Council's approval to accept the State funding and use the integrated screening system.

The Bureau is opposed to seeking City Council's approval to continue using a call screening system, claiming that City Council, through a 1995 intergovernmental agreement, gave control over the policies and procedures of the 9-1-1 Center to the User Board and the Commissioner-in-charge. Contrary to the Bureau's position (and practice), the intergovernmental agreement defines the User Board as an advisory body. The agreement only authorizes the User Board to review policies and make recommendations; the City retained control over the management, operations and administration of the 9-1-1 Center. The agreement also expressly indicates that nothing in the agreement should be construed as a grant of any legislative authority.[3]

Regardless, several considerations favor bringing the matter before the full City Council: the significant public interest in the 9-1-1 system, the interconnectedness of the Bureau's operations with fire and police, and the lack of Council vetting of the original decision. In a public hearing, the Bureau should:

- Present its argument that it needs a cell phone call screening system,

[3] It appears that City Council has effectively relinquished its legislative authority over the Bureau of Emergency Communications, despite the agreement's nondelegation of legislative authority and City Charter language in Section 2-104 that "Council may delegate any of its nonlegislative functions or powers." Unlike every other Bureau in the City, there is no chapter in City Code that establishes the Bureau of Emergency Communications and prescribes its parameters.

- Demonstrate that the one it plans to use is the best option available,[4]
- Report on the early experiences of other jurisdictions using the upgraded system,
- Explain whether the Technology Oversight Committee should have oversight over the upgrade project,
- Explain whether State funding of the phone upgrade is subject to and in compliance with the City's grants management policies, and
- Schedule follow-up reporting to Council to discuss the system's performance.

In the event the Bureau pursues the planned upgrade, it should implement it as soon as possible, notwithstanding its typical practice of avoiding upgrades during the summer months when call volumes are higher.

[4] It is not known what other screening technologies currently exist; however, the California Highway Patrol piloted a different screening system for reducing unintentional wireless calls in in 2001. This system was used during peak 9-1-1 calling times. Calls would only be routed through an automated screening system if an operator first determined no one was on the line. At that point, the operator would switch the call to a separate queue. From there, an automated attendant asked the caller to press any number (or to say yes) if an emergency existed. If the caller did not press a number or say yes after the message played twice, the call was terminated.

CITY OF PORTLAND

BUREAU OF EMERGENCY COMMUNICATIONS

Charlie Hales, Mayor
Steve Novick, Commissioner

Lisa Turley, Director
Post Box 1927
Portland, Oregon 97207
503.823.0911
FAX 503.823.4630
www.portlandoregon.gov/911

Ombudsman Margie Sollinger

Thank you for the opportunity to respond to the Ombudsman Report: Problem with City's Emergency Communications System.

I appreciate this opportunity to continue our public education efforts to provide consistent and continuous messaging for the public to understand the capabilities of the current technology in use at BOEC. First and foremost – technology in the real world is not nearly as awesome as what people see on television and movies. Hopefully, this letter provides additional information about the problem identified, as well as the solutions BOEC has identified and implemented in partnership with BTS.

The Problem

The XMU auto attendant is a complex piece of equipment, and, like most technology, it is not perfect and should never be perceived as infallible. The limitations of the XMU do require callers to follow outlined steps to reach and speak to a call taker.

The XMU does screen out nonresponsive incoming calls to 9-1-1, and it does so without capturing the cell number of the device used to make the call. It should be noted that not all unresponsive calls are screened out; the XMU is very sensitive and detects noises, intentional or unintentional, that it assumes to be the required prompt and moves those calls to the queue where they are answered by the next available call taker.

9-1-1 and emergency calls are not placed on hold; rather, they are queued in an automatic call distribution system and routed to the first available call taker. Actual 9-1-1 calls receive top priority and all 9-1-1 calls (including landline, VOIP and wireless calls) are routed to the top of the queue. Operator-assisted calls, calls from alarm companies, and calls from other 9-1-1 centers are routed in after 9-1-1 calls.

Once in queue, if a call taker is not available, callers hear the following recorded script:

> *"Please do not hang up. This is the 9-1-1 emergency line. The operator will be with you as soon as possible. Do not hang up. We may not be able to send help or call you back if you hang up. Stay on the line please."*

In 30 seconds, another recording is played and will continue until the call is answered:

> *"9-1-1 operators and non-emergency operators are still busy. Please stay on the line. An operator will be with you as soon as possible."*

If a cell caller opts to hang up during these messages, we are unable to retrieve their device information and are unable to return calls to determine if an emergency exists. The actual number of these calls is unknown, but it is very misleading to imply that we "lose" information from thousands upon thousands of calls received in our center.

Solutions

As noted in your report, the scheduled system upgrade will eliminate the technological limitations of the XMU in the spring of 2017. This statewide upgrade offers seamless and equal 9-1-1 services across all jurisdictions in Oregon. BOEC will conduct public education and

outreach to ensure community awareness of the upgrades and system abilities. Again, our messaging must be consistent and continuous to ensure communitywide awareness.

As you noted, in 2004 City Council was apprised of the intention to implement the XMU switch and since then BOEC has always made our Commissioner-in-Charge aware of its continued use and its impact. As an element of our operations, the XMU switch does not require re-approval by Council.

BOEC's jurisdictional partners are aware of the current XMU process and limitations. On October 20, 2016, staff presented early information from the Ombudsman's investigation and report to the User Board, which voted unanimously to continue utilizing the XMU until further notice. Despite concern about the unknown number of intentional calls that the Bureau is not able to call back, at the meeting on October 20, representatives of BOEC's public safety partners indicated that they understand the extraordinary impact turning off the XMU would have on public safety resources.

The assumed increase in workload estimates provided in this report are not an accurate depiction of the potential operational impact to BOEC. The estimates also do not include police and fire resources that would be needed to verify unknown circumstances. In addition, in September and October 2016 BOEC notified the other 9-1-1 centers in Oregon currently using the XMU switch about the technology issue detailed in this report. Those centers concur with BOEC's position that the benefits garnered from continued reliance on this technology far outweigh the potential impacts.

The report also mentions a few short-term steps we have taken to ensure community awareness that callers should not hang up after calling 9-1-1, especially if the call to 9-1-1 is from a cell phone. In addition to updating the recording played when someone is waiting for a 9-1-1 call taker to respond, BOEC has updated our public materials and used social media to get the word out about calling 9-1-1 from a cell phone.

Again, we appreciate your research and ask that you assist us in our continued efforts to keep our callers informed of the limitations of our current system as well as upcoming improvements.

Lisa Turley
BOEC Director