Analysis of the Self-Dispatch Method Utilized by the Bellevue Fire Department with a Focus on Response Time

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CERTIFICATION STATEMENT

I hereby certify that the following statements are true:

1. This paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

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Signed: _____

Printed Name: Anthony C. Schaffer

ABSTRACT

The problem this study addressed is whether the current dispatch process used by the Bellevue Fire Department (BFD) reflected accurate response data. The results concluded the current dispatch process is not reflective of accurate response data. The purpose of this study was to evaluate the existing dispatch methods to determine documentation accuracy, identify delays, and identify areas for improvement based on current fire dispatch standards or other accepted fire/emergency service dispatch practices.

Evaluative research was used to answer the four following questions:

1. What nationally accepted standards for fire service dispatching apply to the BFD?
2. Is there a difference between actual BFD response times versus recorded times?
3. How does the current dispatch process impact the department's overall response time?
4. What changes can be implemented that will improve the dispatching process, reduce overall response time, and at what cost?

The procedure to determine which national standards for the fire service applied to the BFD was through literature review of national standards, local studies, and related call processing criteria. One survey involved communication centers that transfer emergency calls to the BFD. The results identified the operations, how 9-1-1 calls are transferred to the BFD, to other departments, and time associated with the transfer. There was a difference between the BFD dispatch methods and other departments directly dispatched by each communications center, which impacts the BFDs overall response time. The second survey revealed the fire station phone was answered within several parameters set by national standards, within the

survey period. Data from the BFD, Huron and Seneca County Sheriff's Offices were compared. A difference between actual response time versus documented response time was identified.

Some recommendations included (1) working with communication centers serving the BFD, (2) Provide training on current dispatch standards and resource options to BFD, (3) Develop BFD dispatch guidelines, and (4) Explore the feasibility of using an established communication center. Some costs were also included.

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INTRODUCTION

Statement of the Problem

Timely call processing and prompt dispatch of a fire department are critical factors for mitigating an incident in order to save lives, minimize injury, reduce the loss of property, and/or the environment. When an emergency incident occurs, a phone call is received at the Bellevue fire station as the routine means of notification. After the incident is reported the on-duty shift activates the pagers to alert off-duty and paid-on-call personnel to report to the fire station or scene. The Bellevue Fire Department (BFD) has dispatched its personnel for well over twenty-five years. BFD incident reports reflect the time the incident was toned or paged as the time of call or time of alarm. This method of documentation has been the accepted practice for decades.

Data from the BFD Incident Reports (2016a) recorded between 0000 hrs. and 0600 hrs. compared to the *City of Bellevue ShoreTel® Communicator - 5531* network log (2016a) determined there was an average 2.66-minute delay between the time the telephone call was received at the fire station and the time the paging system was activated to alert off-duty fulltime and paid-on-call fire personnel of an emergency incident. The ShoreTel® Communicator – 5531 is the telephone log that records the date, time, and caller identification of incoming and outgoing phone calls at the BFD for the Voice over Internet Protocol (VoIP) network.

There are several possible reasons for a delay in paging emergency incidents which include: on duty personnel could be anywhere in or outside the fire station resulting in a delay answering the emergency phone call; or after writing down the information it takes time to access the dispatch to activate the voice pagers. In other words, if the BFD incident report reflected a 4-minute response time, 2.66 minutes should be added due to the delay after answering the incident to dispatching the incident. The near seven-minute response time does not

include how long it took to transfer the call from the reportee or the amount of time it took to answer the fire station telephone. A call transfer occurs when the 9-1-1 center relays an incident to the appropriate agency. Refer to Table 7 for time of call to time of dispatch details in Appendix 7.

The problem this study will address is whether the current dispatch process used by the BFD reflects accurate response data. The dispatch methods used by the BFD will be examined to evaluate documented response time versus actual response time plus related facets of the BFD dispatching process.

Purpose of the Study

The purpose of this study is to evaluate the existing dispatch methods to determine documentation accuracy, identify delays, and identify areas for improvement based on current fire dispatch standards or other accepted fire/emergency service dispatch practices. The key goals of this research are to reduce overall response time, maintain accurate records, increase the chances of survival, minimize injury, and minimize property and/or environmental losses.

Research Questions

The research questions this study will investigate will be answered by evaluative research:

1. What nationally accepted standards for fire service dispatching apply to the BFD?
2. Is there a difference between actual BFD response times versus recorded times?
3. How does the current dispatch process impact the department's overall response time?
4. What changes can be implemented that will improve the dispatching process, reduce overall response time, and at what cost?

BACKGROUND AND SIGNIFICANCE

The BFD began as a bucket brigade named the "York X Bucket Brigade" at some point in 1830's when the town was named Amsden. The first officially organized fire company recorded its beginning in 1865 (Oddo, 1984, p. 74). When the first mechanized piece of apparatus was delivered in 1919 the first two full-time personnel were hired (Oddo, 1986, p. 104). The addition of these two full-time personnel, a fire chief and driver/mechanic, was the commencement of the combination status of the BFD. The BFD remains a combination, full-time/paid-on-call, staffed department today.

Currently, the BFD has a full-time fire chief, two full-time lieutenants, a full-time firefighter, five paid-on-call sergeants, and ten paid-on-call firefighters. The lieutenants and the full-time firefighter serve as a shift officer. One full-time lieutenant or firefighter is on duty to cover shift one, two, and three. Each shift is twenty-four-hours. The fire chief's normal hours are 0700 hrs. to 1500 hrs. weekdays excluding holidays. Paid-on-call personnel round out the combination fire department. Paid-on-call sergeants and firefighters respond as needed and are used in many of the non-emergency operations of the fire department.

The unique geographical location of the Bellevue city limits includes territory in Huron, Sandusky, and Erie counties. The BFD's first due area also includes Lyme Township (Huron County), Thompson Township (Seneca County), and York Township (Sandusky County). The BFD and Clyde Fire Department share fire coverage in York Township, although when notified the BFD can respond anywhere in York Township. The BFD's first due and shared district encompasses 97 square miles with an estimated population of 12,734 according to U.S. Census Bureau (2016) 2015 estimates (pp. 2-5). According to the BFD Incident Report Log (2017) the BFD responded to 339 total incidents in 2017 (p. 13).

The BFD responds from one fire station located in Downtown Bellevue. Three engines, one ladder-tower, two tankers, one brush truck, several support vehicles, and two trailers for hazardous material responses are available for incident needs. The BFD provides fire suppression, various rescue, hazardous material response, fire prevention, public education, and emergency medical service (EMS) assist including response with Narcane services. Routine first responder and transport EMS are not provided. The BFD first due area includes single-family dwellings, multiple-family occupancies, commercial, light to heavy industrial facilities, a portion of a major railyard, agricultural properties, nursing homes, and a hospital.

The BFD routinely receives calls for service from the Bellevue Police Department (BPD) dispatcher. All 9-1-1 calls in the city are routed to the public safety answering point (PSAP) at the Bellevue Police Station directly through the Huron County 9-1-1 system even though Sandusky and Erie Counties are also within the Bellevue City limits. A PSAP is "a facility in which 9-1-1 calls are answered" (National Fire Protection Agency (NFPA), 2016, 1710-7). All fire department related 9-1-1 calls, within the city limits, are received at the Bellevue Fire Station from the BPD dispatcher through the unrecorded ShoreTel® VoIP telephone system. There are telephones throughout the fire station because the dispatch office is on the first floor of the fire station and the on-duty person may not be sitting in the dispatch office when an alarm is reported.

The BFD also receives calls for service from agencies in four different counties because of the geographical location of the city and the three townships the BFD is contracted to cover. Each of the three townships are in a different county. Some of the other agencies the BFD receives emergency calls from are the PSAP for their respective counties. For example, the Seneca County Sheriff's Office (SeCSO) dispatch normally contacts the BFD by telephone.

There are times when the BFD is called directly by the Huron Co. Sherriff's Office (HCSO) dispatch and North Central Emergency Medical Service (NCEMS). On rare occasions calls are received directly from the Norwalk State Highway Patrol Post, the Erie County Sheriff's Office (ECSO), and Sandusky County Sheriff's Office (SCSO) dispatch.

Despite these occasions, the routine method emergency incidents are routed to the BFD are transfer or direct phone calls from the dispatcher at the BPD. Emergency incidents are also reported by alarm monitoring companies, citizens, local businesses, industries, and others on the fire station's ten-digit emergency phone line. Emergencies are occasionally reported on the business phone line.

There have been instances when an emergency incident is transferred three times before reaching the BFD. For example, on June 19, 2016, a 9-1-1 call that originated inside Bellevue City limits, via cell phone, was answered by SeCSO. They transferred the call to HCSO, who then called the BPD then finally the BFD received the call for this fire (BFD, 2016c, p. 2).

Another instance of multiple transfers occurred June 30, 2017, the reportee called 9-1-1 on a cell phone at 0425 hrs., in the city limits, to report smoke on the second floor of a two-story single-family dwelling. The 9-1-1 call was answered by the SeCSO, which transferred the call to the SCSO because they thought the caller's house was in a township that lies within Sandusky County. Subsequently it was realized the residence was in the city and the call was then passed to the BPD. After gathering the information, the BPD called the BFD to report this incident. The 9-1-1 call duration that showed on the reportee's phone was 3 minutes and 25 seconds. The BFD arrived on scene at 0437 hrs. (Bellevue Fire Department, 2017, p. 2).

After comparing BFD Incident Reports (2016b) between June 18 and July 31, 2016, to *City of Bellevue ShoreTel® Communicator - 5531* network log (2016b) there was an average

delay of 2.18 minutes between the time the phone call was received and the time the incident was paged. The least amount of documented delay was 30 seconds or less and the longest delay was 6 minutes for incidents that were paged as an emergency. The times that were compared were in a 24-hour period. Refer to Table 8 for time of call to time of dispatch details in Appendix 8.

The BFD documents the time of call or time of alarm when the voice pagers of BFD personnel are activated by the person on-duty. NFPA 901 *Standard Classifications for Incident Reporting and Fire Protection Data* (2016) defines the time of alarm (call) as report or alarm time "Report (alarm) time is the time at which the dispatch or alarm center responsible for dispatching the fire department resources first learns of the fire or other incident" (901-15). Therefore, no matter how long it takes to get to the phone, write down the incident information, and get to the dispatch office to page the incident, the time of call on the BFD report reflects when the pagers were activated. According to NFPA 901 (2016) the "Dispatch time is the time at which a fire service resource is notified to respond to an alarm" (901-15). The time of call or time of alarm precedes the dispatch time.

Examples of delays in answering the phone and then paging out incidents includes: the on-duty person may be in the bathroom or shower with a portable phone nearby, working on a vehicle, physical fitness activity, shoveling snow, or any number of other possible tasks that fill a shift. At night, the delay may potentially be longer because the on-duty person first answers the phone call, on an unrecorded line, writes down the information, gets dressed, goes down to the first floor to page the call, and then writes down the time the call was toned as the beginning of the call or time of alarm.

In summary, after an emergency call is transferred or received directly at the BFD by any method, the on-duty lieutenant, firefighter, or the fire chief must activate the pager encoder

located in dispatch office on the first floor of the fire station. The pager encoder "opens" the voice pagers to alert the off-duty full-time and paid-on-call personnel there is an incident. After paging an emergency incident, the on-duty person(s) responds to the scene in one of two front-line engines. The time enroute is not transmitted or documented. The arrival time of the first fire apparatus on scene is normally documented by the BPD or off-duty fire personnel that respond to cover the fire station. Any available paid-on-call personnel respond to the scene except one, who reports to the station. During the gap of time when the BFD is not manned BFD phone calls rollover to the BPD. The BPD has a pager encoder to activate BFD voice pagers, if needed.

The potential impact this study could have on the BFD is to identify areas where improvements can be made in the BFD dispatch process. Ultimately, this could lead to enhancements to the department's response time and service to the City of Bellevue and townships the BFD contractually provides fire coverage.

LITERATURE REVIEW

Early detection of an emergency, prompt call processing, judicious dispatch of fire department resources, and rapid mitigation are crucial aspects in saving lives, minimizing injury, reducing the loss of property, or the environment. According to Upson and Notarianni (2010) "A critical factor in the effectiveness of any emergency response agency is the ability to get personnel and equipment to the scene of the emergency in a timely manner" (p. 3). Mobilization time and travel time are two comprehensive components of response time. Mobilization time includes *alarm transfer time, alarm answering time,* and *alarm processing time* coupled with *turnout time.* These segments of time or tasks are used when "…measuring the time from call receipt at a public safety answering point (PSAP) until the first assigned ERU is physically enroute to the emergency, will be referred to as mobilization time" (Upson and Notarianni, 2010,

p. 3). Various benchmarks were combined using definitions from the 2009 Edition of NFPA 1710 and NFPA 1221 Standards, the current standards during the time of this study.

NFPA 1221 (2016) is the *Standard for Installation, Maintenance, and use of Emergency Services Communications Systems* is not just for the fire service but the standard for all emergency response agencies. This standard covers the infrastructure and operations relating to emergency communications from the communications center, on-scene operations, and supports the Incident Command System used in the field (1221-1). NFPA 1710 (2016) is the *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* was designed to describe the level of service, deployment capabilities, and parameters for response time for career departments (p. 1710-1).

NFPA 1710 (2016) and NFPA 1720 (2014) are clear the fire department shall have reliable communications systems in order to prompt rapid delivery of fire department operations in facilities, with equipment, and using operating procedures in accordance with NFPA 1221 (p. 1710-16 and p. 1720-8). Within Ohio Administrative Code (OAC) (2016) in the *fire department occupational health and safety* section it states "The employer shall establish and ensure the maintenance of a fire dispatch and incident communication system" (para. 10).

NFPA 1710 (2016) standards are clear on the timed parameters a fire department should be operating within. For example, 1) *Alarm Answering Time*, 2) *Alarm Handling Time*, 3) *Alarm Processing Time*, 4) *Alarm Transfer Time*, 5) *Initiating Action/Intervention Time*, 6) *Travel Time,* 7) *Turnout Time*, are all factors in the "*Total Response Time.* The time interval from the receipt of the alarm at the primary PSAP to when the first emergency response unit is initiating action or intervening to control the incident" (p. 1710-8).

NFPA 1710 is referenced for the definitions relating to the total response time standards although NFPA 1720 (2014) *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments* may be more applicable to the BFD for response time because eighty percent of BFD staff is paid-on-call versus twenty percent full-time. This percentage falls within what NFPA 1720 (2014) defines as a combination fire department (1720-6). Response time guidelines vary depending on population density per square mile and travel distance of eight miles or more. The number of personnel that assemble on scene in order to meet the standard also varies based on population density and miles from the station (NFPA, 2014, 1720-7).

Coupled together select portions of NFPA 1710 and NFPA 1720 standards reveal the framework for a minimum number of personnel with the appropriate resources that need to be assembled on scene within a minimum amount of time. Call processing, call transfer, dispatch, turnout time and travel time are all part of that measured time frame.

When documenting an incident *NFPA 901* (2016) defines the time of call or alarm time as the "…time at which the dispatch or alarm center responsible for dispatching the fire department resources first learns of the fire or other incident" (901-15). Even though it takes time to get to the phone, write down the information, and then page the incident, the time of call or time of alarm precedes the dispatch time despite the current method the BFD documents an incident. According to NFPA 901 (2016) the "Dispatch time is the time at which a fire service resource is notified to respond to an alarm" (901-15).

NFPA 1221 (2016): *Standard for the Installation, Maintenance, and Use of Emergency Services* Communications Systems discloses its purpose in more detail. When alarms are received from the public, the operation of facilities and communication systems require specific

guidelines. Retransmission of alarms to the appropriate emergency response agency and personnel standards are spelled out. Installation quality and required levels of performance of emergency services communications systems are all within the purpose of NFPA 1221 (p. 1221-6).

The application of NFPA 1221 (2016) details that communications systems such as telephones, dispatching systems and radio systems apply to emergency and non-emergency communications in a response agency. In addition, the systems apply when communicating with other emergency response agencies, and communication with the public (p. 1221-6).

Some sections of NFPA 1221 Standard (2016) relating to retroactively updating to current standards does apply to existing dispatch facilities or operations, such as: "**1.4.2** In those cases where it is determined that the existing situation involves a distinct hazard to life or property, the authority having jurisdiction shall be permitted to require retroactive application of any provisions of this document" (p. 1221-6). The following chapters and specific sections of Chapter 4 are also included: 1) Chapter 3 - Definitions, 2) Chapter 4 -Communications Centers, 3) Chapter 7 - Operations, 4) Chapter 8 - Telephones, 5) Chapter 12 - Records (pp. 1221-6 – 1221-37). There are other chapters and sections of retroactivity but due to the focus of this study only the chapters that apply are listed.

Several specific benchmarks required by fire dispatch operations in the NFPA 1221 (2016) Standard points out, "Ninety-five percent of the alarms received on the emergency lines shall be answered within 15 seconds, and 99 percent of alarms shall be answered within 40 seconds…" and "With the exception of the call types identified in 7.4.2.2, 90 percent of emergency alarm processing shall be completed within 64 seconds, and 95 percent of alarm processing shall be completed within 106 seconds…" (p. 1221-21). The National Emergency

Number Association (NENA) (2006) standards for answering 9-1-1 calls supports how quickly emergency call should be answered by stating, 90 percent of all 9-1-1 calls arriving at the PSAP shall be answered within 10 seconds during the busy hour and 95 percent of all 9-1-1 calls should be answered within 20 seconds (p. 8).

The APCO/NENA PSAP Service Capability Criteria Rating Scale Work Group (2010) describes adequate staffing levels within 3.2.15.1 Standard Criteria need to be maintained "at or above AHJ minimum during normal 9-1-1 call volume" in order to answer 90 percent of incoming calls within 10 seconds or less (p. 12). Timely call taking is required in the OACs minimum call answering standards (2016) "Ninety per cent of 9-1-1 calls/requests received will be answered withing [SP] ten seconds; with ninety-five per cent of 9-1-1 calls/requests received being answered withing [SP] twenty seconds" (para. 106). Based on the NFPA, APCO, and NENA standards it is evident answering an emergency phone in a timely manner is reinforced by multiple national/international associations and required by the ORC.

When a call is transferred from a Public Safety Answering Point to a secondary answering point it should not take longer than 30 seconds for 95 percent of all alarms processed (NFPA, 2016, p. 1221-21). Related to the topic of time limitations, there are time limits for how long an emergency line should ring and where it should be transferred to if the incoming call is not answered within 60 seconds. A plan must be in place for such instances. In addition, "The transfer procedure shall not rely on the PSAP personnel relaying the information to the responsible communications center" (NFPA, 2016, pp. 1221-24 & 25).

In a recent study by the MCM Consulting Group (2016) relating to the consolidation of PSAPs in Huron County, Ohio reported the following:

> 5. Due to the proliferation of cell phones and the increased number of 911 calls placed from them, calls are often transferred from one PSAP to another, and sometimes even a third…It was stated during this study that residents calling for 911 would need to answer the same questions each time that they were transferred to another PSAP, leading to frustration and doubt in the capability of Huron County's public safety system overall (p. 62)
>
> Recommendations -
>
> 6. The county should establish minimum staffing levels, as required by the adopted PSAP Operations Rules…By allowing calls to route to another PSAP because the primary one is unable to take additional calls because it is effectively under-staffed, is delaying help to the caller and again, not providing the highest level of public safety (p. 67)

According to a separate study by the Huron County 911 Technical Advisory Committee (HCTAC) (2016) changes are needed to reduce call transfers and increase the level of service:

> Getting the lifesaving service our residents need to the location they need it as quickly as possible was the entire reason a 911 system was started…Transferring of 911 calls or relaying information slows down the process of getting assistance out the door and on the road. Reducing these call transfers as much as possible has always been a high priority (p. 3)

Along with the assumption(s) in the HCTAC (2016) study of consolidation there is at least one benefit:

> Service Level Improvements • Reduction or elimination of the transfer of 911 calls between PSAPs will provide quicker call processing and dispatch times,

> resulting in faster response times for field personnel and lowering the potential for human or technology errors. We cannot stress how important this is. In emergency situations, those few seconds can be the difference between life and death (p. 20).

Other criteria used to measure the effectiveness of a fire department's communications system and methods are evaluated by Insurance Services Office (ISO). Within the criteria ISO uses the NFPA 1221 Standard is referenced as part its standards when rating fire service communications and dispatch facilities. According to Insurance Services Office, Inc. (2017a) "The Fire Suppression Rating Schedule (FSRS) measures the major elements of a community's fire protection system and develops a numerical grading called a Public Protection Classification (PPC™)" (para. 1). The PPC™ rating provides a grade between one to ten, Class 1 is the highest rating. Class 10 signifies a department does not meet the minimum criteria set by ISO, which is derived from four FSRS categories to determine the effectiveness of a fire department (ISO, 2017b, para. 1).

The ISO PPC™ rating is a factor for many insurance companies to calculate insurance premiums. The lower PPC™ rating for a fire department by ISO is most desired because it may equate to lower in insurance premiums (ISO, 2017b, para. 2). A summary from the FSRS for evaluating fire department emergency communications dictated by ISO (2017c and 2017d) is as follows:

> Emergency communications
>
> Emergency reporting - **3 points**
>
> Telecommunicators: ISO credits the performance of the telecommunicators in accordance with the general criteria of NFPA 1221 - **4 points**

> Dispatch circuits: ISO credits the number and type of dispatch circuits in accordance with the general criteria in NFPA 1221. **3 points**
>
> Emergency communications total: **10 points**
> (2017c, para. 2)

Relating to the evaluation, the ISO field representative will also request emergency communications center data which includes 1) contact names, e-mail addresses, and phone numbers for communications officials, 2) emergency (9-1-1) reporting and fire dispatch protocol, and 3) telecommunicator performance based on call detail analysis, training, and certifications emergency power supply (2017d, para. 2).

In 2013 ISO completed the most recent PPC® for the BFD. The PPC® Summary for the BFD (2014) tallied a total of 4.65 credits out of 10 credits in the emergency communications category of the FRFS (p. 6). The emergency communications category includes facilities used to dispatch the fire department to structure fires. In the telecommunicator section .9 out of a total of 4 credits were earned. There were zero credits in the areas of alarm receipt, alarm processing, and emergency dispatch protocols (BFD PPC® Summary, 2014, pp. 6-8).

The above ISO sections reinforce reasons to follow nationally approved methods of dispatching a fire department, such as procedures, accurate documentation, facilities, and proper training, even though some of the graded sections are currently beyond the control of the BFD. Some improvements may be economically feasible to implement and others may require a procedural or policy change to increase the credits in order to work toward a lower PPC® score.

A lower PPC™ score may lower insurance premiums for industry, commercial and/or residential properties in the City of Bellevue. Each insurance company determines how it uses the PPC® results in determining its fire insurance procedure for underwriting is policies. The expense to upgrade some segments of the emergency communications system would need to be

compared to the insurance savings. The Bellevue Fire Department has a PPC® Class 5 rating, if full credit is achievable Table 1 illustrates the remaining point needed to attain a PPC® Class 4 rating if ten credits in the emergency communications category of the FRFS are earned. Credits are calculated into points; the total points are used to determine which class rating a fire department receives. For example, the range of points to earn a Class 5 rating is between 50.00 to 59.99 on a 100-point scale (BFD PPC® Summary, 2014, p. 3).

Table 1

ISO Rating Information

CITY	**Bellevue**
[Current] ISO Rating	5
Total Points	53.91
Points Needed for Next Level	6.09
Points Available if Dispatch Achieves 10/10 Points	5.35
Points Remaining	***0.74***

NOTE: Adapted and modified from Huron County 911 Technical Advisory Committee. (2016). *Huron County 911 PSAP Consolidation Study*, p.55. Retrieved from http://www.huroncountyema.org/index.php/download_file/view/66/1/

The HCTAC (2016) revealed some of the costs to implement county wide dispatch in relation to each department, including the BFD, (1) Station alerting is an estimated $18,000 per station. Station alerting notifies the fire personnel on duty, turns lights on, and much more, (2) Mobile Computing Technology for use in each BFD vehicle is estimated at $5,000 per apparatus, (3) Responder alerting is technology, with responder input, can be integrated into the CAD, to show who is responding to an incident with an estimated $1,000 cost per station to start, (4) Table Command would assist the incident commander with scene safety, incident management and other tasks at a cost of $500 per tablet. The software is an estimated $250 (pp.34-36). Based on BFD run volume, “the dispatch fee would be in the neighborhood of $266.00 a month” by the HCSO (T. Wagner, personal communication, January 8, 2018).

PROCEDURES

A conversation was initiated, by the author, with the fire chief to discuss the direction of this research project. Several retired fire department members were asked the length of time the BFD has been self-dispatching its members. All procedures including data collection, analysis, printed, and on-line literature review, were performed by the author of this study.

Literature review began with online and eventually printed sources relating to fire service communications, dispatch standards, call processing, and response time. On a local level, the Huron County Local Emergency Planning Committee (HCLEPC) provided recent studies relating to the consolidation of PSAP and dispatch centers within and near Huron County. Review of the ORC and OAC has led to revealing what laws may apply to this subject. The literature review was used to compile the standards, criteria, recommendations, current practices, and other supporting documentation on this topic.

Evaluative research methods have been used in the research samples. The collection of data began with the review of the *City of Bellevue ShoreTel® Communicator - 5531* network log. Coupling this information together indicated a discrepancy in the time of call recorded on the fire report versus the time of call on the BFD ShoreTel® VoIP phone log. The previously noted information was available at the Bellevue Fire Station. Records related to BFD incidents will be collected from the BPD, Huron, Erie, Seneca, Sandusky Counties, and NCEMS to verify the original time the incident was reported. Collectively this information will be compared to the BFD Ohio Fire Incident Reporting System (OFIRS) generated report to determine how long it takes the BFD to actually respond to incidents.

Personal or phone interviews with the PSAPs supervisor or designated representative the BFD receives transfer or direct calls from will include: (1) Bellevue Police Department, (2) Erie

County Sheriff's Office, (3) Huron County Sheriff's Office, (4) North Central Emergency Medical Services, (5) Sandusky County Sheriff's Office, and (6) Seneca County Sheriff's Office.

A phone call from the author will precede the survey and request for information then these questions with requests for information will be sent to the above-named agencies before the interviews are scheduled. The interview should take approximately an hour after the records are gathered. The intent is to determine the level of training, staffing, written protocols, or procedures, records for call processing and/or transfers related to the BFD. In addition, if there is a difference between the BFD dispatch methods and other departments directly dispatched by each communications center. Any records are acquired from these PSAPs should provide the time of the initial 9-1-1 call.

A data request from the Huron County 9-1-1 provider for BFD related incidents has been initiated through the Huron County EMA to review the following: (1) The time to complete a 9-1-1 call transfer from HCSO to BPD, (2) Time it takes BPD to answer the transfer on average, (3) The time for the BPD to notify the BFD, (4) Time the BPD 9-1-1 dispatcher spends with the caller before the button is pressed to transfer to the BFD, and (5) Amount of time the phone rings at the BFD before it is answered. If access to the other counties data is possible it will be reviewed and compared. The shortest and longest times will be revealed, then an average of all 9-1-1 incidents.

A detailed review of the BFD self-dispatch documentation procedure will be completed and compared to applicable national standards. Ultimately, current BFD dispatch methods will require analysis to determine any impact on documented response time versus actual response time. Data between various date/time frames, details in the Results Section, from the following records will be complied:

- **Time the call was received at the Bellevue Fire Department** – This is available on the *City of Bellevue ShoreTel® Communicator - 5531* network VoIP telephone log
- **Average time the call was toned or paged** – This is available on the BFD Incident Report Log or BFD OFIRS documents
- **Average time to arrive on scene** – This is available on the BFD OFIRS documents

This will be compared with the time the call was received from the PSAP and the time the call was transferred to BFD which will show the total response time. In addition, a survey of the BFD process will be used with on duty personnel. This survey will provide input from more than the author's shift.

The on-duty personnel will be asked to complete a survey worksheet in order to determine an estimate on how long it takes to answer emergency phone calls based on the number of rings it takes to answer the phone. There is a total of four personnel that will be asked to complete this worksheet. The worksheets will be tabulated on separate survey instrument to determine the minimum number, maximum number, and average number of rings it took to answer emergency phone calls between September 1, 2017 and November 9, 2017. A reason will be documented if it took over three rings to answer the emergency phone call. The results will be shared. The worksheet should take the on-duty personnel a minute or less to complete for each emergency phone call and can be completed after the incident is over.

Definition of Terms

Alarm - "A signal or message from a person or device indicating the existence of an emergency or other situation that requires action by an emergency response agency" (NFPA, 2016, 1221-8).

APCO - Association of Public-Safety Communications Professionals International (2017) "…serves the needs of public safety communications practitioners worldwide…by providing complete expertise, professional development, technical assistance, advocacy and outreach" (para. 1). APCO also develops related standards for the American National Standards Institute (APCO, 2017b, para 1).

CALEA - The Commission on Accreditation for Law Enforcement Agencies, Inc.

City of Bellevue ShoreTel® Communicator - 5531 network log - The phone history log shows the time, duration, and caller identification of calls that ring into the fire station.

EMS - Emergency medical service.

ERU – Emergency response unit.

MVC - Motor vehicle crash.

NENA - National Emergency Number Association (2017) "…serves the public safety community as the only professional organization solely focused on 9-1-1"…NENA works with others… "to facilitate the creation of an IP-based Next Generation 9-1-1 system; and to establish industry leading standards, training, and certifications" (para. 1-2).

NFPA - National Fire Protection Agency.

OFIRS - Ohio Fire Incident Reporting System.

ORC – Ohio Revised Code.

PSAP - A Public Safety Answering Point is "A facility in which 9-1-1 calls are answered" (NFPA, 2016, 1710-7).

Toned or Toned out - Toned or Toned out refers to electronically activating fire department voice pagers to alert off-duty and paid-on-call fire fighters of an incident.

VoIP - Voice over Internet Protocol.

Limitations of the Study

The initial amount of information was scaled back due to the quantity of data that would have required analysis. As a result, the time of call data was narrowed to the HCSO and SeSCO, instead of all agencies. There were only a few relevant incidents that came through Sandusky County and Erie County. The actual time of call from those entities encompassed a small sample compared to Huron County and Seneca County PSAPs.

The BFD does not normally first respond to emergency medical incidents. The BFD is normally called by NCEMS or BPD if NCEMS requests assistance at a scene. The initial time of call for the majority of emergency medical incidents was not relevant to this research.

In addition to emergency medical incidents, the BFD is not automatically called for all motor vehicle crashes (MVC). Therefore, when reviewing the data, there was a large time gap between the time of the original call compared to the time the BFD was called for some of the motor vehicle crashes and at least one emergency medical incident. Obvious occurrences between original time of call to notification of the BFD for MVCs were removed from the averages revealed in the results section.

Another limitation included an apparent time difference between the PSAP clock and the clock used at the BFD. Due to the apparent lack of synchronization between each clock it was not possible to determine exactly how much of the delay was due to the time it took to gather information, transfers to other agencies, then notify the BFD about the incident plus any time delay between the phone call to the BFD station then dispatch the incident.

Data was requested from the Huron County 9-1-1 provider for BFD related incidents initiated through the Huron County EMA on June 30, 2017, for the following: (1) The time to complete a 9-1-1 call transfer from HCSO to BPD, (2) Time it takes BPD to answer the transfer

on average, (3) The time for the BPD to notify the BFD, (4) Time the BPD 9-1-1 dispatcher spends with the caller before the button is pressed to transfer to the BFD, (5) Amount of time the phone rings at the BFD before it is answered.

Due to multiple factors, the requested information was received on December 15, 2017. After review, the data received was not relevant and too broad in scope, expect one page, the time it took BPD to answer 9-1-1 calls. Other sources of this information were sought out directly through the HCSO, BPD, and SeCSO. HSCO and SeCSO were able to provide the time PSAP or time their dispatch was notified.

Another limitation was the literal interpretation of the word transfer in the communications center survey questionnaire. The use of the term …notify the BFD… may have applied to this research more precisely. Exchanging the terms is suggested if this study is replicated because of the survey responses by most of the agencies.

There may not have been enough ring surveys completed or enough data for accurate results of how long, on average, it takes to answer the phone at the fire station and the reasons why it may have taken three or more rings to answer the phone. A longer survey period is suggested if this study is replicated.

Regarding the *City of Bellevue ShoreTel® Communicator - 5531* network log. The phone call history log shows the time, duration, and caller identification of phone calls that ring into the fire station. As recent calls come in older calls are not saved. Approximately four months of calls are saved in the history. Due to this, comparing time of call at the fire station with the time of dispatch was limited.

RESULTS

Five out of six communication centers that transfer emergency calls to the BFD returned surveys. Survey feedback was received from the Bellevue Police Department, Erie County Emergency Management office with cooperation of the sheriff's office, Huron County Sheriff's Office, and Sandusky County Sheriff's Office in cooperation with the emergency management office between September 6 and December 14, 2017.

The surveys were utilized to determine the level of training, staffing, written protocols or procedures, records for call processing and/or transfers related to the BFD. In addition, the surveys were crafted to find any differences between the BFD dispatch process and other departments directly dispatched by each communication center. Survey results are broken down into several sections, beginning with Table 2 which summarizes the operation components of the PSAPs that serve the BFD. Refer to Appendix 1 for PSAP survey questions. Refer to Appendix 2 for complete PSAP survey results.

Table 2

Summary of operations of PSAPs that serve the BFD	N	%
PSAP at communications center	5	100
Formal training program for dispatchers/call takers	5	100
Dispatchers/call takers are certified through APCO or another recognized agency	4	80
National standard(s) are used by the communication centers for call processing, call transfer, and/or training	4	80
Communications center is accredited	1	20
Written procedure for call processing	4	80
Written procedure for call transfers	3	60
Time is tracked via computer aided dispatch (CAD)	4	80
Time is tracked via phone and radio logs not CAD	1	20

The results also revealed the PSAPs dispatch anywhere from one to 17 fire departments, one to six law enforcement agencies, zero to seven emergency medical service (EMS) agencies separate from the fire service, and zero to two other agencies. The total number of agencies dispatched by the communications centers is 66.

Only one of the respondents staffed zero to one call takers. Staffing of dispatchers varied widely among communication centers. Three of the communication centers have a minimum staffing per shift of one. One facility has minimum of three and a maximum of six dispatchers per shift. The remaining dispatch center staffed a minimum of two dispatchers.

The three out of five PSAPs provided the average time it takes their dispatch center to notify the BFD after the time of call between January 1, 2016 and December 31, 2016. The average time was 21.6 seconds. The results varied on how the BFD was notified by the PSAP.

Much of the time, three PSAPs call the BFD directly via the telephone and two call the BPD. The BPD then calls the BFD on the telephone. The least amount of time reported was 15 seconds and the longest time was 30 seconds. Four out of five communications centers tracked time via CAD. The other used the phone and radio logs.

Between January 1, 2016 and December 31, 2016, the average time other fire departments are notified by their dispatch was 18.3 seconds. Ten to 15 seconds were the shortest and longest times. The average reported time, from time of call to time dispatched, was 31.25 seconds according to four surveys that a time was shared. The shortest time was 10 seconds the longest time was one minute and 30 seconds. The dispatching agencies procedure for dispatching the respective fire departments was by pagers. If they did not directly dispatch a particular department they notified or transferred the call through a land line.

One request for information that was available from the Huron County 9-1-1 provider revealed the time it takes BPD to answer the related 9-1-1 transfer calls. According to WestTel (2017) between June 1, 2016 and December 14, 2017, the BPD answered 1445 9-1-1 calls. Of those calls 99.10 percent were answered within 10 seconds and 100 percent were answered within 20 seconds. The shorted answer time was 5.9 seconds and the longest was 15 seconds (p. 1).

The on-duty Bellevue fire personnel were asked to complete a *Survey Worksheet for Bellevue Fire Personnel Relating to Fire Department Dispatch Process* in order to determine how many times the phone rang before answering emergency calls received at the fire station between September 1, 2017 and November 9, 2017. This provided an estimate of how long it took to answer emergency calls. Shift One submitted 12 worksheets, Shift Two submitted six worksheets, and Shift Three submitted three worksheets. One did not meet the criteria for the

survey. A total of 20 relevant worksheets were submitted. Thirty-four total emergency phone calls were received. Thirty-five total emergency incidents were dispatched. The minimum number of rings was 0.5. The maximum number of rings was three. The average number of rings before phone was answered was 1.825. The incident received at the fire station that was not reported on the telephone during the survey time frame was not recorded on a survey worksheet. Refer to Table 3 for reported number of rings before phone was answered. Refer to Table 4 for reported reason the number of rings was three or more. Refer to Appendix 3 for survey worksheet. Refer to Appendix 4 for survey details.

Table 3

Reported number of rings before phone was answered

	Number of rings	
	N	%
Phone answered in one (1) ring or less	6	30
Phone answered in two (2) rings or less	11	55
Phone answered in three (3) rings or more	3	15
Total	20	100

Table 4

Reported reason the number of rings was three or more

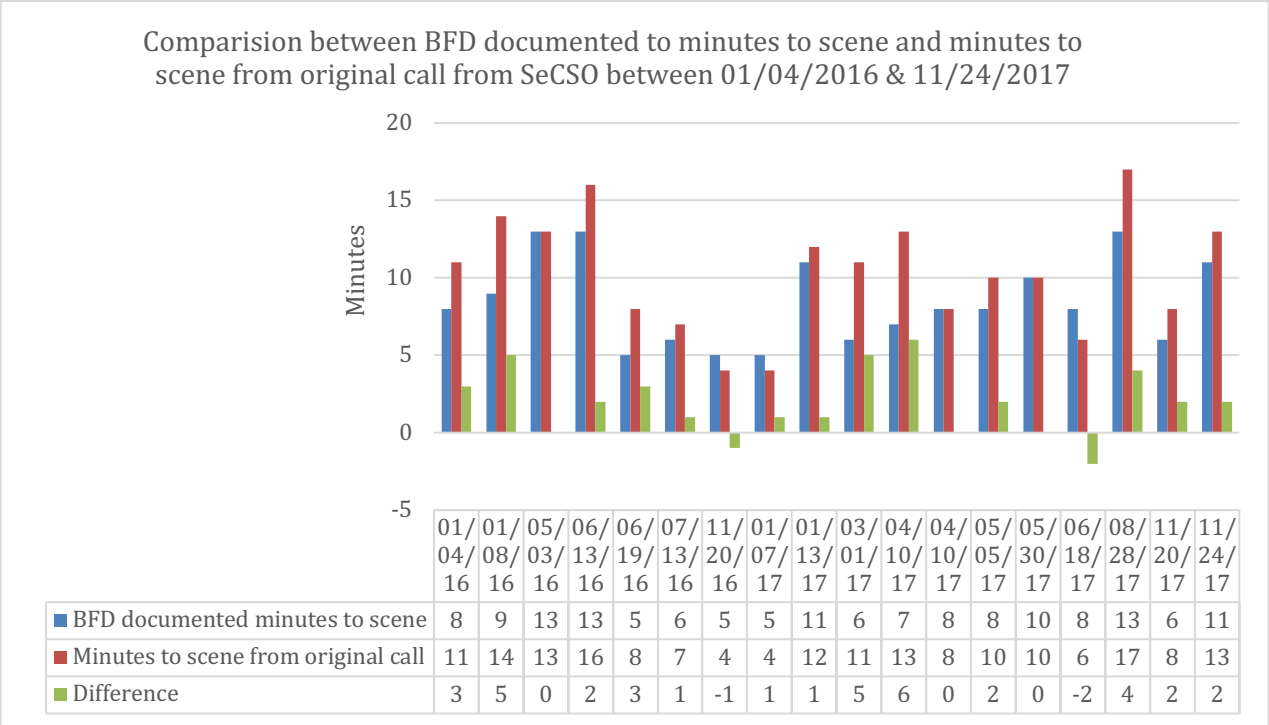
	Reason	
	N	%
Apparatus/Equipment checks	1	.33+
Outdoor tasks	0	0
On the other line	0	0
Restroom or shower	0	0
Building maintenance	0	0
Vehicle maintenance	0	0
Training	0	0
Cleaning	0	0
Down time activity	2	.66+
Other	0	0
Total	3	100

Data from the BFD Incident Reports (2017d) recorded between August 22 and December 7, 2017, were compared to the *City of Bellevue ShoreTel® Communicator - 5531* network log (2017c). The data analysis determined there was average 1.457-minute delay between the time the telephone call was received at the fire station and the time the paging system was activated. Nine of the 59 incidents were paged within the same minute the call came in. The longest difference was 6 minutes. Of the 59 incidents, time of call to time of dispatch took an estimated one minute or less 66 percent of the time. Refer to Table 9 in Appendix 8 for detailed results.

SeCSO (2017) provided data relating to BFD incidents showing time of call to the SeCSO dispatch, between January 4, 2016 and December 14, 2017. The information provided was correlated with BFD Incident Reports (2017b) in order to compare response time from actual time of call versus BFD documented response time. Refer to Figure 1. Two out of the 17 incidents were outside of Thompson Township. One was in the City of Bellevue June 19, 2016 and the other was in Lyme Township January 7, 2017. Times were requested for seven other incidents reported during this time period from SeCSO but those phone calls did not originate with the SeCSO.

The average documented BFD time to respond to the scene for 18 incidents 8.388 minutes. The information provided was correlated with BFD Incident Reports (2017b) in order to compare response time from actual time of call versus BFD documented response time. When the original emergency call time is factored into the overall response time, the average time to respond to the scene increased to 10.277 minutes, a 1.889-minute difference. There were there were 5 incidents that had a zero or less difference in response time. The longest gap between PSAP time and BFD time was six-minutes. The incident on November 20, 2016 and June 18, 20117, reflect a negative time difference. This difference may be due to the lack of synchronization between the BFD clock and the SeCSO clock. Refer to Table 5 in Appendix 5 for SeCSO detailed results.

Figure 1



	01/04/16	01/08/16	05/03/16	06/13/16	06/19/16	07/13/16	11/20/16	01/07/17	01/13/17	03/01/17	04/10/17	04/10/17	05/05/17	05/30/17	06/18/17	08/28/17	11/20/17	11/24/17
BFD documented minutes to scene	8	9	13	13	5	6	5	5	11	6	7	8	8	10	8	13	6	11
Minutes to scene from original call	11	14	13	16	8	7	4	4	12	11	13	8	10	10	6	17	8	13
Difference	3	5	0	2	3	1	-1	1	1	5	6	0	2	0	-2	4	2	2

01/08/2016 was a medical assist. The BFD is not normally requested after PSAP notification for medical assists.

11/20/2016 was a house fire. There may have been a time difference between SeCSO and BFD dispatch clock.

04/10/2017 was an injury crash. BFD not always immediately called for MVCs.

06/18/2017 was an injury crash. There may have been a time difference between SeCSO and the BFD dispatch clock.

Two factors regarding the length of response time. This township is 36 square miles and train delays are not uncommon.

The HCSO (2017) provided data relating to 68 BFD incidents showing time of call between January 7, 2017 and December 4, 2017. The information provided was correlated with BFD Incident Reports (2017c) in order to compare response time from actual time of call versus BFD documented response time. Eleven out of the 68 incidents were removed from the overall response time average because they were medical or MVC related and it was clear the BFD was not called on the initial PSAP call. For example, on June 8, 2017, there was a 33-minute difference between the original call to the time the BFD dispatched its personnel. Another one was removed because the BFD time of call was 27 minutes before the HCSO time. Times were

requested for four other incidents reported during this time period from HCSO but those phone calls did not originate with the HCSO.

The average documented BFD time to respond to the scene for 56 incidents was 6.178 minutes. When the original emergency call time is factored in to the overall response time for 56 incidents, the average time to respond to the scene increased to 8.571 minutes, a 2.393-minute difference. There were there were eight incidents that had a zero or less difference in response time. The largest gap between PSAP time and BFD time was eight-minutes. Six incidents reflect a negative one-minute time difference and three incidents show a negative two-minute time difference. The differences may be due to the lack of synchronization between the BFD clock and the HCSO clock. Refer to Table 6 in Appendix 6 for HCSO detailed results.

Is there a difference between actual BFD response times versus recorded times? According to the results there is a difference between actual BFD response times versus recorded times. The results revealed the average time of call or alarm is 1.457 minutes before dispatch. When coupled with the two other instances the time of call to time of dispatch revealed earlier in this research, the average time difference is 2.099 minutes between actual BFD response times versus recorded times. The BFD total response time is also impacted by its current dispatch process. This is apparent when the PSAP times from the HSCO and SeCSO are combined displaying an average difference of 2.141 minutes from PSAP time and the BFD time of call.

DISCUSSION

The discussion will identify which nationally accepted standards for fire service dispatching apply to the BFD and how the current dispatch process impacts the department's overall response time. The research results and the literature review will be compared and used for comparison.

NFPA 901 (2016) clarifies the time of call versus the time of dispatch as follows "…time at which the dispatch or alarm center responsible for dispatching the fire department resources first learns of the fire or other incident". The "Dispatch time is the time at which a fire service resource is notified to respond to an alarm" (901-15). According to these standards it does not appear the current dispatch documentation process used by the BFD reflects accurate response data based on current standards. For decades, the BFD has used the dispatch time as the time of call. NFPA 1710 (2016) describes other time parameters that are part of response time.

Time factors in the "*Total Response Time" according to* NFPA 1710 (2016) standards are 1) *Alarm Answering Time*, 2) *Alarm Handling Time*, 3) *Alarm Processing Time*, 4) *Alarm Transfer Time*, 5) *Initiating Action/Intervention Time*, 6) *Travel Time,* 7) *Turnout Time* (p. 1710-8). Even though some of these factors are out of BFD control, the BFD total response time is impacted by its current dispatch process. This is evident when the PSAP times from the HSCO and SeCSO are combined showing an average difference of 2.141 minutes from PSAP time and the BFD time of call. The time requirement PSAP calls are transferred in is also not being met.

When a call is transferred from a Public Safety Answering Point to a secondary answering point it should not take longer than 30 seconds for 95 percent of all alarms processed (NFPA, 2016, p. 1221-21). PSAP times from the HSCO and SeCSO show an average difference of 2.141 minutes from PSAP time and the BFD time of call. Some of this time difference is

explained by one or more call transfers. The MCM Consulting Group (2016) found PSAPs in Huron County, Ohio reported, “Due to the proliferation of cell phones and the increased number of 911 calls placed from them, calls are often transferred from one PSAP to another, and sometimes even a third…” (p. 62).

A separate study by the HCTAC (2016) reinforces the stance on reducing call transfers, “Transferring of 911 calls or relaying information slows down the process of getting assistance out the door and on the road” (p. 3). The benefits include, “Reduction or elimination of the transfer of 911 calls between PSAPs will provide quicker call processing and dispatch times, resulting in faster response times for field personnel and lowering the potential for human or technology errors” (p. 20).

The purpose of the *Survey for Bellevue Fire Personnel Relating to Fire Department Dispatch Process* was to determine how often emergency calls were being answered in the 15 second time frame and if not, what was the delaying factor. This was based on NFPA 1221 (2016) Standard, “Ninety-five percent of the alarms received on the emergency lines shall be answered within 15 seconds, and 99 percent of alarms shall be answered within 40 seconds…”, some exceptions apply (p. 1221-21). Between three and four rings of the telephone at the BFD was in the 15 second range. Utilizing the limited data on how quickly the phone was answered at the BFD, the results showed the phone was answered in approximately 15 seconds or less.

Minimum call answering standards are required by OAC (2016) “Ninety per cent of 9-1-1 calls/requests received will be answered withing [SP] ten seconds; with ninety-five per cent of 9-1-1 calls/requests received being answered withing [SP] twenty seconds” (para. 106). This is direct correlation with NENA (2006), ninety percent of all calls arriving at the PSAP

shall be answered within ten seconds during the busy hour [and] ninety-five percent of all 9-1-1 calls should be answered within twenty seconds (p. 8).

The time parameter that the emergency calls are answered, information gathered, and units dispatched is referred to as alarm processing (NFPA 1221, 2016, 1221-9). Ninety percent of emergency alarm processing shall be completed within 64 seconds, and 95 percent of alarm processing shall be completed within 106 seconds…" there are some exceptions (p. 1221-21). Of the 59 incidents recorded between, August 22 through December 7, 2017, alarm processing took an estimated one minute or less 66 percent of the time.

There are sections of NFPA 1221 (2016) that apply to the BFD. This standard covers the infrastructure and operations relating to emergency communications from the communications center, on-scene operations, and supports the Incident Command System used in the field (1221-1). Some sections of NFPA 1221 Standard (2016) relating to retroactively updating to current standards does apply to existing dispatch facilities or operations (p. 1221-6). There are others that apply as well.

A portion of NFPA 1710 (2016) points out call processing, call transfer, dispatch, turnout time and travel time standards (1710-8). Although, the NFPA 1710 benchmark times of "total response time" do not change, the standards of response in NFPA 1720 (2014) may be more applicable to the BFD for response time because eighty percent of BFD staff is paid-on-call versus twenty percent full-time. This percentage falls within what is defined as a combination fire department (1720-6).

NFPA 901 (2016) is a standard that could guide the BFD to current fire reporting documentation standards. APCO International (2017) can be used to cross reference standards, be a source of training and certification because it "…serves the needs of public safety

communications practitioners worldwide…by providing complete expertise, professional development, technical assistance…" (para. 1). APCO also develops related standards for the American National Standards Institute (APCO, 2017b, para 1). NENA (2017) is another set of standards that can be used a reference because it "…serves the public safety community as the only professional organization solely focused on 9-1-1" …NENA works with others… "to establish industry leading standards, training, and certifications" (para. 1-2).

Changes to the current BFD dispatch methods may improve the BFDs relatively recent ISO PPC Summary® relating to emergency communications. The PPC® Summary for the BFD (2014) tallied a total of 4.65 credits out of 10 credits in the emergency communications category of the FRFS (p. 6). In the telecommunicator section .9 out of a total of 4 credits were earned. There were zero credits in the areas of alarm receipt, alarm processing, and emergency dispatch protocols (BFD PPC® Summary, 2014, pp. 6-8).

The current dispatch process does impact the department's overall response time. Several factors are noted: (1) The discussion above linking the national standards NFPA, NENA, APCO, other criteria like ISO with the research results shows most current standards/criteria are not being met. (2) The geographical location of Bellevue which directly and indirectly receives emergency calls from six communications centers that each have their own PSAP. (3) Unless an incident is called directly to the BFD the call information has to be relayed, sometimes more than once. (4) The difficulty to accurately document benchmark times because of the apparent unsynchronized times between PSAP and the BFD. (5) The average length of time it takes the PSAP to transfer or notify the BFD of an incident does not meet national standards. (6) The average length of time it takes to complete call processing once the BFD is notified of an incident does not meet national standards.

RECOMMENDATIONS

This study set out to explore whether the current dispatch process used by the BFD reflected accurate response data. After evaluating the existing dispatch methods utilized by the BFD and compared with evaluative research, determined documentation changes should be made, delays in the dispatch process were identified, and areas of improvement are evident. Based on current fire dispatch standards and other accepted fire/emergency service dispatch practices: What changes can be implemented that will improve the dispatching process, reduce overall response time, and at what cost? The first recommendation begins with training.

Provide an awareness training course relating to the documentation, dispatch, call processing, response standards and criteria which would include NFPA, NENA, ORC, and OAC. With supporting data and information from the local HCLEPC reports, and this research. Review resources available for dispatch training or certification of BFD personnel including APCO. Follow-up the training with dialogue from BFD personnel for suggestions, methods that can reduce response time, equipment that may be needed, and changes to documentation.

Open dialogue with the six PSAPs that serve the BFD response area. Request input from the PSAP authorities about methods to improve the BFD dispatch process, reduce response time, and uncover possible resources from one or more of the four counties. Explore what information the PSAPs need from the BFD and what the BFDs needs from the PSAPs. Discuss a method or system to synchronize PSAP clocks with the BFD.

Draft BFD guidelines reflecting the change from the current method of recording the time of dispatch as the time of call to current standards. Consider tracking other times, such as enroute time. Suggestions from the BFD personnel and the input from the PSAPs should be considered during the guideline drafting process.

Inform the six PSAPs that the BPD does not dispatch the BFD. In written form, request the PSAP to call the BFD instead of the BPD. Work with the PSAP to draft guidelines based on their protocols for calling the BFD directly and the type of incidents the BFD should be notified immediately for. Provide mapping information relating to the BFD first due area. Discuss with the PSAPs and others adjusting the direction of some cell towers that may be going to the incorrect PSAP. This may reduce transfer calls. Note: One PSAP normally calls the BFD, some others are beginning too.

Research funding options for dispatch improvements and/or contracting out dispatch services. Explore the feasibility, financial and otherwise, of having the HSCO dispatch the BFD. According to the Huron County 9-1-1 coordinator, Huron County is in the beginning stages of upgrading its communication center (T. Bond, personal communication, January 8, 2018). Research and compare initial and long-term cost the feasibility of other PSAPs with the HCSO results to provide dispatch services to the BFD. Additional research will be needed to identify the cost versus benefit to improve BFD dispatch methods to achieve full points within the PPC® Scale of emergency communications.

The HCTAC (2016) revealed some of the costs to implement county wide dispatch in relation to each department, the BFD included:

(1) Station alerting is an estimated $18,000 per station; The BFD has one station.

(2) Mobile Computing Technology (MCT) for use in each BFD vehicle is estimated at $5,000 per apparatus. There would be between seven and nine vehicles that would use and MCT.

(3) Responder alerting is technology is an estimated $1,000 cost per station to start.

(4) Table Command at a cost of $500 per tablet. The software is an estimated $250 (pp.34-36).

(5) “The dispatch fee would be in the neighborhood of $266.00 a month” by the HCSO based on the current run volume (T. Wagner, personal communication, January 8, 2018).

A full study would be needed to ascertain the upfront and ongoing costs associated with using an outside communication center.

The changes for Bellevue and townships the BFD contractually provides fire coverage for will be a fire department that responds in a timelier manner and with improvements to documentation. Ideally, the changes bring about a contract for dispatch services with one of the PSAPs that already serve the BFD. Until then, provide an improved self-dispatch process with better equipment, increased training in dispatch, documentation, and call processing methods. The main reason for incorporating many of these ideal changes of the BFD dispatching process cannot be understated. Ultimately, timely call processing and prompt dispatch of a fire department are critical factors for mitigating an incident in order to save lives, minimize injury, reduce the loss of property, and/or the environment.

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APPENDIX 1 – SURVEY INSTRUMENT OF COMMUNICATIONS CENTERS THAT TRANSFER EMERGENCY CALLS TO THE BELLEVUE FIRE DEPARTMENT

Ohio Fire Executive Program Applied Research Project Data Collection Tool

The following survey questions will be asked in a personal interview or phone interview with the supervisor or approved designee of communications centers that transfer emergency calls to the Bellevue Fire Department between the time frame this survey is approved and the data collection deadline. Date of interview: _____

1. What is the name of this agency?

   _____

2. What is your name and contact phone number?

   Name: _____ **Phone:** _____

3. Is there a PSAP at this communications center?

   A. **Yes** B. **No**

4. If no, where is the PSAP?

   Name and location of facility: _____

5. If yes, for which fire service agencies does the PSAP cover?

Name: _____ _____

Name: _____ _____

Name: _____ _____

Name: _____ _____

Name: _____ _____

Name: _____ _____

Place others on the reverse side of this paper

Name of Agency: _____

6. What type and number of agencies are dispatched by this communications center?

   Number of fire agencies: _____ Number of law enforcement agencies: _____

   Number of EMS agencies separate from a fire department: _____

   Other number of agencies: _____ Total number of agencies: _____

7. What are the maximum/minimum number of call takers and dispatchers on duty during shift?

   Call takers: _____ max. _____ min. Dispatchers: _____ max. _____ min.

8. Is there a formal training program for dispatchers/call takers?

   A. Yes B. No

9. Are the dispatchers/call takers certified through APCO or other recognized agency?

   A. Yes B. No If yes, which one: _____

10. Are national standard(s) such as NFPA 1221, NFPA 1061, NENA, APCO, CALEA, or others used by this communications center for call processing, call transfer, and/or training?

    A. Yes B. No If yes, which one(s): _____

11. Is this communications center accredited?

    A. Yes B. No If yes, by which accrediting agency: _____

12. Is there a written procedure for call processing?

    A. Yes B. No If yes, is a copy available?

13. Is there a written procedure for call transfers?

    A. Yes B. No If yes, is a copy available?

Name of Agency: _____

14. What is the procedure to transfer emergency calls to the Bellevue Fire Department?

_____

_____

_____

_____

15. How long does it take from time of call to notify the BFD – on average?

Average amount of time in minutes and seconds between January 1, 2016 through December 31, 2016 - _____ minutes _____ seconds

16. How are emergency calls transferred to other fire departments?

_____

_____

_____

17. How long does it take from time of call to notify other fire departments – on average?

Average amount of time in minutes and seconds of a random number notifications between January 1, 2016, through December 31, 2016 - _____ min._____ sec.

18. If calls are not transferred, how are emergency calls dispatched to other fire departments?

_____

_____

_____

Name of Agency: _____

19. How long does it take from time of call to time of fire department dispatch – on average?

    Average amount of time in minutes and seconds of a random number notifications between January 1, 2016, through December 31, 2016 - _____ min. _____ sec.

20. Is time tracked via computer aided dispatch (CAD) or other means?

    A. Yes B. No

21. If other, what are the means?

    _____

    _____

22. Questions the author should have asked? Comments?

    _____

    _____

    _____

    _____

    _____

APPENDIX 2 – SURVEY RESULTS FROM COMMUNICATIONS CENTERS THAT TRANSFER EMERGENCY CALLS TO THE BELLEVUE FIRE DEPARTMENT

The following survey questions were asked and/or completed in a personal interview, phone interview or in two cases the survey was completed by the entity with minimal interaction by the author with the supervisor or approved designee of communications centers that transfer emergency calls to the Bellevue Fire Department between, September 5, 2017 and December 14, 2017.

1. What is the name of this agency?

   Bellevue Police Department, Erie County EMA, Huron County Sheriff's Office, North Central Emergency Medical Services, and Sandusky County EMA

2. What is your name and contact phone number?

   Names: BPD - Joel Bickhart – BPD, Gary Wobser - ECEMA, HCSO - Kelli Chapman and Steven Shupp, Joseph Micheletti – NCEMS, SCEMA - Lisa Kuelling, and SCSO – Tina Anderson. **Phone:** _____

3. Is there a PSAP at this communications center?

   A. Yes - 5 B. **No - 0**

4. If no, where is the PSAP?

   Name and location of facility: No responses

5. If yes, for which fire service agencies does the PSAP cover?

Name: Sandusky FD	Vermilion FD	Perkins FD
Name: Kelleys Island FD	Huron FD	Margaretta Twp. FD
Name: Groton Twp. FD	Bay View FD	Milan Township FD
Name: Berlin Township FD	Huron River FD	North Fairfield FD

Name: New London FD Tri-Community Fire District

Name: Townsend FD Wakeman FD Bellevue FD

Name: Fire department that respond to calls within Sandusky County are Ballville Fire Bellevue Fire (dispatched by Bellevue PD), Bettsville Fire, Bradner Fire (dispatched by Wood Co.), Clyde Fire (dispatched by Clyde PD), Elmore Fire (dispatched by Ottawa Co). Fremont Fire, Gibsonburg Fire, Green Springs Fire, Helena Fire, Kansas Fire, Lindsey Fire, Portage Fire (dispatched by Ottawa Co), Rising Sun Fire (dispatched by Wood Co), Sandusky Township Fire, Townsend Township Fire, and Woodville Township Fire

Place others on the reverse side of this paper – None listed

6. What type and number of agencies are dispatched by this communications center?

   Number of fire agencies: 1, 2, 6, 8, 17

   Number of law enforcement agencies: 1, 1, 3 + parks dept. + Dog Warden, 5, 6

   Number of EMS agencies separate from a fire department: 0, 0, 1, 3, 7

   Other number of agencies: No answer, 0, 0, 1, 1 (Haz-mat) 1 (EMA)

   Total number of agencies: 3, 7, 11, 14, 31

7. What are the maximum/minimum number of call takers and dispatchers on duty during shift?

   Call takers: 0, 0, 0, 0, 0 **max.** 0, 0, 0, 0, 1 **min.**

   Dispatchers: 1, 1, 2, 3, 6 **max.** 1, 1, 1, 2, 3 **min.**

8. Is there a formal training program for dispatchers/call takers?

   A. Yes - 5 B. No - 0

9. Are the dispatchers/call takers certified through APCO or other recognized agency?

   A. Yes - 4 B. No – 1 If yes, which one: APCO X 3. Priority Dispatch

10. Are national standard(s) such as NFPA 1221, NFPA 1061, NENA, APCO, CALEA, or

others used by this communications center for call processing, call transfer, and/or training?

A. **Yes - 4** **B. No - 1** **If yes, which one(s):** APCO X 2. State Standards, NFPA, NENA. Priority Dispatch. EMD training through after 1-2018

11. Is this communications center accredited?

A. Yes - 1 **B. No - 4** **If yes, by which accrediting agency:** APCO

12. Is there a written procedure for call processing?

A. Yes - 4 **B. No - 3** **If yes, is a copy available?** No answer, In protocols, No answer, No answer, through Erie Co. Sheriff.

13. Is there a written procedure for call transfers?

A. Yes - 3 **B. No - 2** **If yes, is a copy available?** No answer X 5

14. What is the procedure to transfer emergency calls to the Bellevue Fire Department?

- We get the information and call the fire department.
- ESCO transfers call to Bellevue PD. Identifies themself, states location of the call and nature then completes the transfer of caller.
- Unless there was an error in how NCEMS received the call, we never transfer to the BFD.
- Call the Bellevue Fire Station Direct
- Dispatcher will determine the location and nature of the emergency before transferring the call to Bellevue. Dispatcher will remain on the line to ensure the call is successfully connected to Bellevue before the call is disconnected on our end.

15. How long does it take from time of call to notify the BFD – on average?

Average amount of time in minutes and seconds between January 1, 2016 through December 31, 2016 –

N/A- minutes N/A - seconds

0 - minutes 20 - seconds

0 - minutes 15 - seconds

0 - minutes 30 - seconds

_____ minutes _____ seconds – Call is transferred to the Bellevue PD, we would not know how long that is then on their end to notify Bellevue Fire.

16. How are emergency calls transferred to other fire departments?
    - NCEMS never transfers to fire departments.
    - Immediate call to Norwalk, Bellevue, or Willard PD – Immediate other PSAPs have info on screen via Alert Public Safety Solutions.
    - N/A
    - Through PSAPs if available.
    - If the emergency is at a location within our county, we take all the information and dispatch the calls. If the emergency is occurring at a location outside of our county but rings into our center, we confirm the location and the nature of the emergency before transferring to the appropriate agency. We ensure the call is connected to that agency before disconnecting on our end.
17. How long does it take from time of call to notify other fire departments – on average?

    Average amount of time in minutes and seconds of a random number notifications between January 1, 2016, through December 31, 2016 –

    N/A - min. N/A - sec.

    0 - min. 10 - sec.

    0 - min. 10 - sec. – Once information is obtained, it is 10 seconds or less

0 - min. 15 - sec.

_____ min. _____ sec. – No answer

18. If calls are not transferred, how are emergency calls dispatched to other fire departments?

- Page personnel
- We are the primary PSAP for MTFD and BTFD and we dispatch those agencies when we receive the call. We are a secondary PSAP for everything else and do not receive any fire calls.
- ESCO contacts the dispatch center of jurisdictional department and relays all important information.
- N/A
- We gather all necessary information and generate a call in our CAD system, then dispatch the appropriate departments (given type of emergency) by dropping tones and maintain radio communications with responding units.

19. How long does it take from time of call to time of fire department dispatch – on average?

Average amount of time in minutes and seconds of a random number notifications between January 1, 2016, through December 31, 2016 –

N/A - min. N/A - sec.

0 - min. 10 - sec. – Once information is received it is 10 seconds or less

0 - min. 15 - sec.

0 - min. 15 - sec.

1 - min. 30 - sec.

20. Is time tracked via computer aided dispatch (CAD) or other means?

A. Yes - 4 B. No - 1

21. If other, what are the means?

    - Phone Log and Radio Log
    - CAD and in house reporting system

22. Questions the author should have asked? Comments?

    - ESCO Communications Supervisor is Sgt. Greg Krumnow. If you would like further information or confirmation from him, his email is …oh.gov.
    - Please be advised that not every call for help is the same, so often times call reporting data is difficult to compare calls to one another. Some callers know exact location and nature of their emergency, and are able to articulate it quickly and clearly to a dispatcher. Others may be completely unaware of their location, very vague on details of an emergency ("I don't know what is going on, I just hear someone screaming help!"), some callers are so emotional that they are not able to speak clearly or find the words to tell us what is going on. All of the things and may more circumstances can come into play when taking a call for help and they greatly affect the response time (in dispatching and transferring to the appropriate agency). The longer a dispatcher must be on a call determining the exact nature and location of a call, the longer the [SP] it will be before a call can be transferred or tones can be dropped by our department for a response.

APPENDIX 3 – SURVEY WORKSHEET FOR BELLEVUE FIRE PERSONNEL RELATING TO FIRE DEPARTMENT DISPATCH PROCESS

Shift #1 - ____ Shift #2 - ____ Shift #3 - ____

1. Date emergency phone calls was received - _____ **, 2017**
2. Time emergency phone call was received - _____ **hrs.**
3. How many rings did it take to answer the phone for this emergency call –

   Number of rings - _____

4. Circle or complete one answer below based on question 3? *Example - Circle a. or b. if the phone was answered in 2 rings or less. Circle or complete one of the other options if the number is higher than 2 rings.*

   a. Phone answered in one (1) ring or less
   b. Phone answered in two (2) rings or less
   c. Apparatus/Equipment checks
   d. Outdoor task
   e. On the other line
   f. Restroom or shower
   g. Building maintenance
   h. Vehicle maintenance
   i. Training
   j. Cleaning
   k. Down time activity
   l. Other -

      _____

5. Was the emergency reported at the fire station in method other than through the telephone? **Yes No**

   If yes, what method was used to report this emergency?

   _____

   Initials of person completing this survey - _____

   Please, place completed worksheet in Lt. Schaffer's kitchen mailbox.

APPENDIX 4 – SURVEY RESULTS FROM THE BELLEVUE FIRE PERSONNEL RELATING TO FIRE DEPARTMENT DISPATCH PROCESS

The on-duty Bellevue Fire personnel were asked to complete a worksheet in order for the author to tabulate the following survey questions for emergency calls received by any method between September 1, 2017 and November 9, 2017.

Sheets completed by each shift - Shift #1 - **12** Shift #2 - **6** Shift #3 – **3-**See note below

1. How many emergency phone calls were received between September 1, 2017 and November 9, 2017? **Total number of emergency phone calls received - 34**
2. How many rings, on average, did it take to answer the phone for emergency calls between September 1, 2017 and November 9, 2017?

Average number of rings – 1.825

3. **Minimum number of rings – 0.5 Maximum number of rings - 3**

a. Phone answered in one ring or less **- Number of calls 6**

b. Phone answered in two rings or less **- Number of calls 11**

c. Phone answered in three or more **- Number of calls 3**

4. Totals below are based on three or more rings.

c. Apparatus/Equipment checks **- Number of calls 1**

d. Outdoor task **- Number of calls 0**

e. On the other line **- Number of calls 0**

f. Restroom or shower **- Number of calls 0**

g. Building maintenance **- Number of calls 0**

h. Vehicle maintenance **- Number of calls 0**

i. Training **- Number of calls 0**

j. Cleaning	**- Number of calls**	**0**
k. Down time activity	**- Number of calls**	**2**
l. Other – None reported	**- Number of calls**	**0**
	Total number of calls -	**20**

Place more than one "Other" on the back of this page – **None recorded**

5. Were any alarms or incidents received at the fire station other than through the telephone between September 1, 2017 and November 9, 2017?

   Yes No How many? _____

   Note: The one incident not reported on the phone was not documented.

   Note: 21 worksheets were turned in one was for a non-emergency call.

APPENDIX 5 – TABLE 5 - ORIGINAL TIME OF CALL DETAIL FOR BFD INCIDENTS FROM SENECA COUNTY SHERIFF'S OFFICE – 01/04/2016 TO 11/24/2017

Table 5

Date	BFD Documented Time of Call	Seneca County Sheriff's Office Time of Call	BFD ShorTel Communicator Time of Call	BFD documented minutes to scene	Minutes to scene from original call	Difference
1/4/2016	1422 hrs.	1419 hrs.		8	11	3
1/8/2016	2340 hrs.	2335 hrs.		9	14	5
5/3/2016	2035 hrs.	2035 hrs.		13	13	0
6/13/2016	1036 hrs.	1034 hrs.		13	16	2
6/19/2016	1845 hrs.	1842 hrs.		5	8	3
7/13/2016	1602 hrs.	1601 hrs.	1600 hrs.	6	7	1
11/20/2016	1445 hrs.	1446 hrs.		5	4	-1
1/7/2017	2211 hrs.	2010 hrs.		5	4	1
1/13/2017	0839 hrs.	0838 hrs.		11	12	1
3/1/2017	2129 hrs.	2124 hrs.		6	11	5
4/10/2017	0805 hrs.	0758 hrs.		6	13	6
4/10/2017	1555 hrs.	1555 hrs.		8	8	0
5/5/2017	1136 hrs.	1134 hrs.		8	10	2
5/30/2017	2146hrs.	2146 hrs.		10	10	0
8/28/2017	0823 hrs.	0819 hrs.	0821 hrs	13	17	4
11/20/2017	1033 hrs.	1031 hrs.	1031 hrs	6	8	2
11/24/2017	1831hrs.	1829 hrs.	1830 hrs.	11	13	2

APPENDIX 6 – TABLE 6 - ORIGINAL TIME OF CALL DETAIL FOR BFD INCIDENTS FROM THE HURON COUNTY SHERIFF'S OFFICE – 1/7/2017 TO 12/04/2017

Table 6

Date	BFD Documented Time of Call	Huron County Sheriff's Office Time of Call	ShorTel Communicator Log Time of Call	BFD documented minutes to scene	Minutes to scene from original call	Difference
1/7/2017	1346 hrs.	1341 hrs.		5	10	5
1/9/2017	0956 hrs.	0954 hrs.		10	12	2
1/13/2017	1402 hrs.	1359 hrs.		7	10	3
1/20/2017	2107 hrs.	2107 hrs.		3	3	0
1/24/2017	1520 hrs.	1522 hrs.		6	8	2
2/1/2017	1725 hrs.	1703 hrs.		5	27	22
2/19/2017	1434 hrs.	1426 hrs.		8	16	8
2/21/2017	1448 hrs.	1440 hrs.		6	12	6
2/24/2017	1820 hrs.	1814 hrs.		4	10	6
3/5/2017	1030 hrs.	1026 hrs.		6	10	4
3/14/2017	0422 hrs.	0422 hrs.		18	18	0
3/14/2017	2145 hrs.	2139 hrs.		7	13	6
3/26/2017	1754 hrs.	1753 hrs.		4	5	1
4/2/2017	1225 hrs.	1205 hrs.		4	24	20
4/2/2017	0823 hrs.	0819 hrs.		9	14	5
4/5/2017	2220 hrs.	2222 hrs.		8	6	-2
4/6/2017	1634 hrs.	1634 hrs.		4	4	0
4/6/2017	2310 hrs.	2310 hrs.		10	10	0
4/16/2017	1242 hrs.	1241 hrs.		11	12	1
4/18/2017	1030 hrs.	1029 hrs.		5	6	1
4/28/2017	2304 hrs.	2304 hrs.		6	6	0
5/13/2017	0753 hrs.	0745 hrs.		4	12	8
5/23/2017	1730 hrs	1727 hrs.		7	10	3
6/3/2017	1020 hrs.	1022 hrs.		3	1	-2
6/3/2017	1133 hrs.	1134 hrs.		4	3	-1
6/6/2017	1949 hrs.	1945 hrs.		5	9	4
6/8/2017	1851 hrs.	1818 hrs.		5	38	33
6/11/2017	1318 hrs.	1312 hrs.		2	8	6
6/14/2017	1220 hrs.	1222 hrs.		7	5	-2
6/15/2017	0835 hrs.	0834 hrs.		8	9	1
6/16/2017	1415 hrs.	1412 hrs.		5	8	3
6/20/2017	1124 hrs.	1120 hrs.		7	11	4
6/25/2017	0912 hrs.	0912 hrs.		4	4	0
6/30/2017	2039 hrs.	2039 hrs.		6	6	0
7/7/2017	0824 hrs.	0822 hrs.		8	10	2
7/11/2017	1837 hrs.	1830 hrs.		4	11	7
7/14/2017	1752 hrs.	1750 hrs.		8	10	2
7/15/2017	1703 hrs.	1730 hrs		7	n/a	n/a
7/19/2017	0637 hrs.	0608 hrs.		2	31	29
7/19/2017	1058 hrs.	1058 hrs.		11	11	0
7/26/2017	1237 hrs.	1238 hrs.		7	6	-1
8/1/2017	0908 hrs.	0907 hrs.		5	6	1
8/2/2017	1709 hrs.	1710 hrs.		8	7	-1
8/11/2017	2119 hrs.	2116 hrs.		6	9	3
8/15/2017	1936 hrs.	1932 hrs.		6	10	4
8/18/2017	1557 hrs.	1553 hrs.		10	14	4
8/20/2017	1708 hrs.	1700 hrs.		5	13	8
8/20/2017	2151 hrs.	2148 hrs.		7	10	3
8/21/2017	0438 hrs.	0437 hrs.		3	4	1
8/21/2017	0622 hrs.	0618 hrs.		5	9	4
9/5/2017	1505 hrs.	1458 hrs.	1504 hrs.	4	11	7
9/6/2017	0243 hr.	0234 hrs.	0240 hrs.	6	15	9
9/8/2017	1948 hrs.	1935 hrs.	1946 hrs.	13	26	13
9/13/2017	1216 hrs.	1210 hrs.	1215 hrs.	8	14	6
9/14/2017	1142 hrs.	1137 hrs.	1141 hrs.	1	6	5
9/18/2017	0518 hrs.	0516 hrs.	0515 hrs.	5	7	2
9/21/2017	1649 hrs.	1642 hrs.	1647 hrs.	6	13	7
10/24/2017	1933 hrs.	1928 hrs.	1933 hrs.	7	12	5
11/6/2017	1117 hrs.	1118 hrs.	1116 hrs.	2	1	-1
11/10/2017	1717 hrs.	1713 hrs.	1715 hrs.	9	13	4
11/10/2017	2036 hrs.	2025 hrs.	2035 hrs.	2	13	11
11/16/2017	1037 hrs.	1036 hrs.	1037 hrs.	6	7	1
11/20/2017	1613 hrs.	1609 hrs.	1613 hrs.	4	8	4
11/23/2017	1602 hrs.	1544 hrs.	1602 hrs.	6	24	18
11/30/2017	0728 hrs.	0714 hrs.	0727 hrs.	5	19	14
12/2/2017	1139 hrs.	1136 hrs.	1138 hrs.	4	7	3
12/3/2017	1012 hrs.	1013 hr.	1011 hrs.	2	1	-1
12/4/2017	1807 hrs.	1808 hrs.	1806 hrs.	5	4	-1

Note: Dates highlighted in yellow were not used because of the gap in time between the time of call to HCSO compared to the time of call to the BFD. These were MVCs. The BFD is not always automatically called for MVCs.
Note: The date highlighted in red was eliminated because it came in after BFD was called

APPENDIX 7 – TABLE 7 - BFD TIME OF CALL COMPARED WITH SHORETEL TIME OF CALL – 3/13/2016 TO 7/3/2016

Table 7

Date	BFD Documented Time of Call	ShorTel Communicator Log Time of Call	Difference
3/13/2016	0345 hrs.	0341 hrs.	4
5/10/2016	0200 hrs.	0157 hrs.	3
5/22/2016	0226 hrs.	0224 hrs.	2
5/29/2016	0507 hrs.	0504 hrs	3
6/17/2016	0015 hrs.	0013 hrs.	2
6/18/2016	0558 hrs.	0555 hrs.	3
6/23/2016	0225 hrs.	0222 hrs.	3
6/28/2016	0047 hrs.	0045 hrs.	2
7/3/2016	0111 hrs.	0109 hrs.	2

APPENDIX 8 – TABLE 8 - BFD TIME OF CALL COMPARED WITH SHORETEL TIME OF CALL – 6/18/2016 TO 7/31/2016

Table 8

Date	BFD Documented Time of Call	ShorTel Communicator Log Time of Call	Difference
6/18/2016	0558 hrs.	0555 hrs	3
6/18/2016	1442 hrs.	1441 hrs.	2
6/19/2016	1845 hrs.	1843hrs.	2
6/21/2016	2150 hrs.	2149 hrs.	1
6/22/2016	1921 hrs.	1919 hrs.	2
6/23/2016	0025 hrs.	0022 hrs.	3
6/23/2016	1038 hrs.	1035 hrs.	3
6/24/2016	2316 hrs.	2314 hrs.	2
6/28/2016	0047 hrs.	0045 hrs.	2
6/30/2016	1054 hrs.	1051 hrs.	3
7/1/2016	1619 hrs.	1617 hrs.	2
7/2/2016	1314 hrs.	1312 hrs.	2
7/3/2016	0111 hrs.	0109 hrs.	2
7/4/2016	0956 hrs.	0954 hrs.	2
7/7/2016	0942 hrs.	0941 hrs.	1
7/8/2016	1257 hrs.	1257 hrs.	0
7/8/2016	1358 hrs.	1356 hrs.	2
7/9/2016	1319 hrs.	1322 hrs.	3
7/11/2016	1017 hrs.	1015 hrs.	2
7/13/2016	1157 hrs.	1156 hrs.	1
7/13/2016	1602 hrs.	1600 hrs.	2
7/13/2016	2058 hrs.	2055 hrs.	3
7/15/2016	1718 hrs.	1717 hrs.	1
7/17/2016	2234 hrs.	2230 hrs.	4
7/19/2016	0010 hrs.	0005 hrs.	5
7/19/2016	0600 hrs.	0054 hrs.	6
7/20/2016	1437 hrs.	1434 hrs.	3
7/21/2016	1525 hrs.	1524 hrs.	1
7/22/2016	1129 hrs.	1128 hrs.	1
7/24/2016	1513 hrs.	1512 hrs.	1
7/25/2016	0109 hrs.	0106 hrs.	3
7/30/2016	1450hrs.	1448 hrs.	2
7/31/2016	1303 hrs.	1302 hrs.	1

APPENDIX 9 – TABLE 9 - BFD TIME OF CALL COMPARED WITH SHORETEL TIME OF CALL – 8/22/2017 TO 12/14/2017

Table 9

Date	BFD Documented Time of Call	ShorTel Communicator Log Time of Call	Difference
8/22/2017	1540 hrs.	1538 hrs.	2
8/24/2017	1315 hrs.	1313 hrs.	2
8/25/2017	1752 hrs.	1751 hrs.	1
8/25/2017	1827 hrs.	1825 hrs.	2
8/26/2017	0907 hrs.	0906 hrs.	1
8/28/2017	0823 hrs.	0821 hrs.	2
8/30/2017	1045 hrs.	1044 hrs.	1
9/1/2017	1931 hrs.	1930 hrs.	1
9/2/2017	1610 hrs.	1609 hrs.	1
9/5/2017	0831 hrs.	0830 hrs.	1
9/5/2017	1505 hrs.	1504 hrs.	1
9/6/2017	0243 hr.	0240 hrs.	3
9/7/2017	0801 hrs.	0800 hrs.	1
9/8/2017	1948 hrs.	1946 hrs.	2
9/9/2017	2032 hrs.	2031 hrs.	1
9/11/2017	0549 hrs.	0547 hrs.	2
9/11/2017	1948 hrs.	1947 hrs.	1
9/13/2017	1216 hrs.	1215 hrs.	1
9/13/2017	2210 hrs.	2209 hrs.	1
9/14/2017	1142 hrs.	1141 hrs.	1
9/18/2017	0005 hrs.	0003 hrs.	2
9/18/2017	0518 hrs.	0515 hrs.	3
9/18/2017	1346 hrs.	1346 hrs.	0
9/20/2017	1504 hrs.	1503 hrs.	1
9/21/2017	1649 hrs.	1647 hrs.	2
9/23/2017	1616 hrs.	1615 hrs.	1
10/1/2017	0613 hrs.	0610 hrs.	3
10/1/2017	0628 hrs.	0630 hrs.	2
10/3/2017	0550 hrs.	0547 hrs.	3
10/7/2017	0438 hrs.	0436 hrs.	2
10/8/2017	1238 hrs.	1237 hrs.	1
10/11/2017	0502 hrs.	0459 hrs.	3
10/13/2017	2123 hrs.	2122 hrs.	1
10/23/2017	2154 hrs.	2152 hrs.	2
10/24/2017	1933 hrs.	1933 hrs.	0
10/29/2017	1943 hrs.	1941 hrs.	2
11/6/2017	1029 hrs.	1029 hrs.	0
11/6/2017	1117 hrs.	1116 hrs.	1
11/6/2017	1648 hrs.	1648 hrs.	0
11/9/2017	2109 hrs.	2107 hrs.	2
11/10/2017	1717 hrs.	1715 hrs.	2
11/10/2017	2036 hrs.	2035 hrs.	1
11/12/2017	1156 hrs.	1153 hrs.	3
11/13/2017	0113 hrs.	0107 hrs.	6
11/15/2017	1933 hrs.	1931 hrs.	2
11/16/2017	1037 hrs.	1037 hrs.	0
11/20/2017	1033 hrs.	1031 hrs.	2
11/20/2017	1613 hrs.	1613 hrs.	0
11/23/2017	1602 hrs.	1602 hrs.	0
11/24/2017	0914 hrs.	0914 hrs.	0
11/24/2017	1831 hrs.	1830 hrs.	1
11/29/2017	0627 hrs.	0626 hrs.	1
11/30/2017	0728 hrs.	0727 hrs.	1
11/30/2017	1312hrs.	1312 hrs.	0
12/1/2017	1812 hrs.	1811 hrs.	1
12/2/2017	1139 hrs.	1138 hrs.	1
12/3/2017	1012 hrs.	1011 hrs.	1
12/4/2017	1807 hrs.	1806 hrs.	1
12/13/2017	0318 hrs.	0315hrs.	3
12/14/2017	1151 hrs.	1150 hrs.	1