



Office of the City Auditor

*Committed to increasing government efficiency, effectiveness,
accountability and transparency.*

Department of Emergency Communications

Emergency Communications Audit

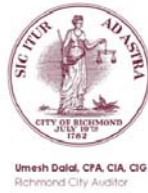
Report#: 2016-08



Issue Date: May 10, 2016

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Richmond City Council

The Voice of the People

Richmond, Virginia

Office of the City Auditor

Executive Summary

May 10, 2016

The Honorable Members of Richmond City Council
Honorable Mayor Dwight Jones,

The City Auditor's Office has completed an audit of the City's Department of Emergency Communications (DEC). Emergency communications systems are critical when citizens face emergency situations, which may involve their health and safety. The objectives of this audit were to:

- Evaluate the effectiveness of the emergency communications function;
- Evaluate the staffing pattern to verify the adequacy of coverage; and
- Evaluate the time to respond to calls in accordance with established priorities.

Based on audit procedures and observations, the auditors concluded that DEC provides services effectively and processes calls within established performance measures. The Department manages available staff effectively, however, an updated staffing analysis needs to be done to identify current staffing needs.

The City Auditor's Office appreciates the cooperation of the DEC staff during this audit. The responses to the report are attached. Please contact me if you have any questions or comments.

Sincerely,

Umesh Dalal

Umesh Dalal, CPA, CIA, CIG
City Auditor

cc: Selena Cuffee-Glenn, Chief Administrative Officer
The Richmond City Audit Committee
John Buturla, Deputy Chief Administrative Officer of Operations
Stephen Willoughby, Director Emergency Communications

COMPREHENSIVE LIST OF RECOMMENDATIONS

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INTRODUCTION, OBJECTIVES, AND METHODOLOGY

Emergency communications systems are critical when citizens face emergency situations, which may involve their health and safety. In an emergency situation, a citizen can dial 9-1-1 to reach the local area's Emergency Communications Center, where trained staff are ready to answer the call and process the information quickly in order to dispatch the appropriate emergency responder (i.e. police, fire, EMS).

The City Auditor's Office has completed an audit of the City's Department of Emergency Communications (DEC) for the 12 months ended June 30, 2015. The objectives of this audit were to:

- Evaluate the effectiveness of the emergency communications function;
- Evaluate the staffing pattern to verify the adequacy of coverage; and
- Evaluate the time to respond to calls in accordance with established priorities.

The auditors conducted this performance audit in accordance with Generally Accepted Government Auditing Standards. Those Standards require that the auditors plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for their findings and conclusions based on the audit objectives. The auditors believe that the evidence obtained provides a reasonable basis for their findings and conclusions based on the audit objectives.

Methodology

The auditors performed the following procedures to complete this audit:

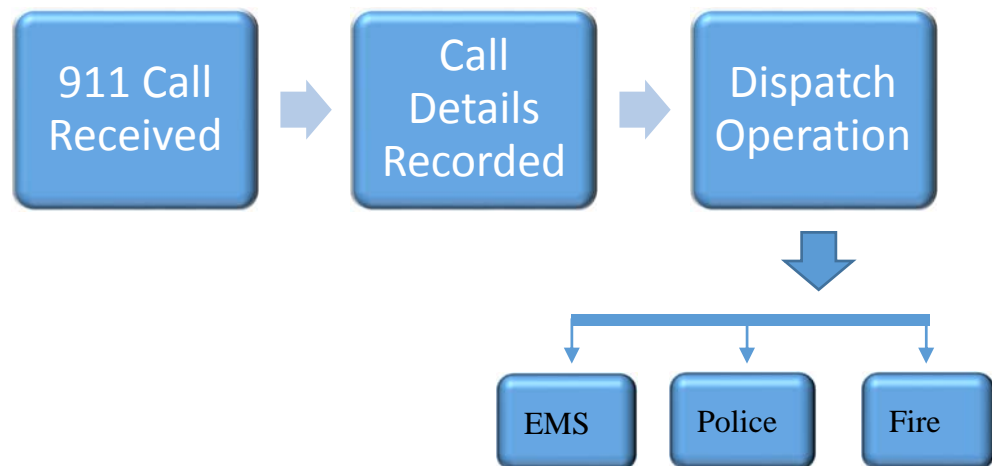
- Analyzed call volume, minimum staffing requirements, and actual staffing levels to determine the adequacy of DEC's required staffing schedule.
- Surveyed six localities in the Eastern United States (Baltimore, MD; Baton Rouge, LA; Fayetteville, NC; Montgomery, AL; Norfolk, VA; Rochester, NY) regarding their emergency communication staff schedules, shift durations, call volume, overtime, continuing education, etc. The survey results were compared to the City of Richmond's DEC.
- Performed a call timing test to determine how long an average cell phone call takes from placement to receipt in the Richmond 911 call center.
- Measured 911 call answering times against National Emergency Number Association (NENA) national standards:
 - Calls answered within 10 seconds during the busy hour (4:00 pm)
 - All calls answered within 20 seconds
- Analyzed call event entry and total processing (entry and dispatch) times.
- Analyzed abandoned calls.
- Determined whether DEC is routinely performing quality assurance (QA) reviews of the Communications Officers' call taking and dispatch performance.
- Reviewed DEC's Continuity of Operations Plan and Emergency Evacuation Plan and compared to NENA national standards.
- Analyzed overtime data for the Department.
- Conducted an employee satisfaction survey for Communications Officers.

MANAGEMENT RESPONSIBILITY

The City management is responsible for ensuring resources are managed properly and used in compliance with laws and regulations; programs are achieving their objectives; and services are being provided efficiently, effectively, and economically.

BACKGROUND

In May 2014, the former Division of Emergency Communications of the Police Department was abolished to create a new Department of Emergency Communications (DEC). DEC's first operating year as a separate department was FY2015. They are responsible for coordinating all emergency radio dispatch and telephone communications for Public Safety Agencies in the City of Richmond. DEC is among the busiest 911 call centers in the Commonwealth of Virginia. The Richmond 911 operators answer over a thousand calls a day.



Source: Auditor Prepared

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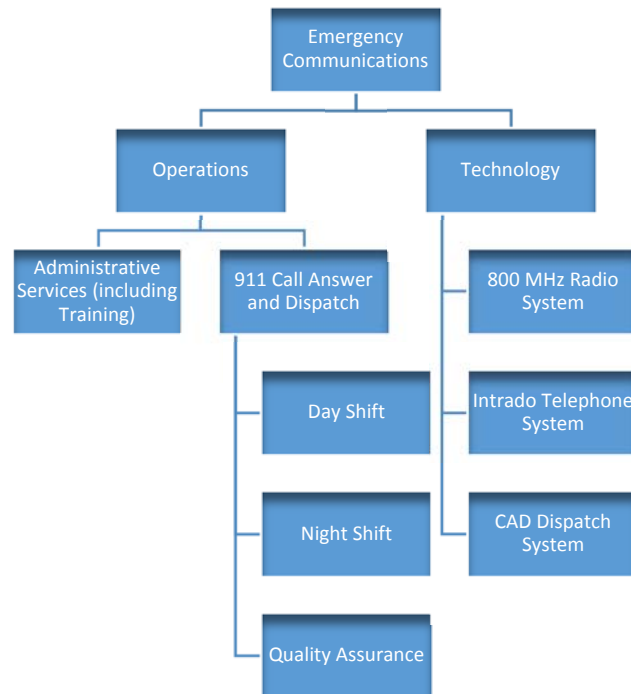
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DEC is primarily governed by the Virginia Department of Criminal Justice Services (DCJS). DCJS is under the direction of the Criminal Justice Services Board, the policy-making body for carrying out the duties and powers relative to criminal justice standards and training. DEC follows DCJS established minimum training guidelines when training new Communications Officers.

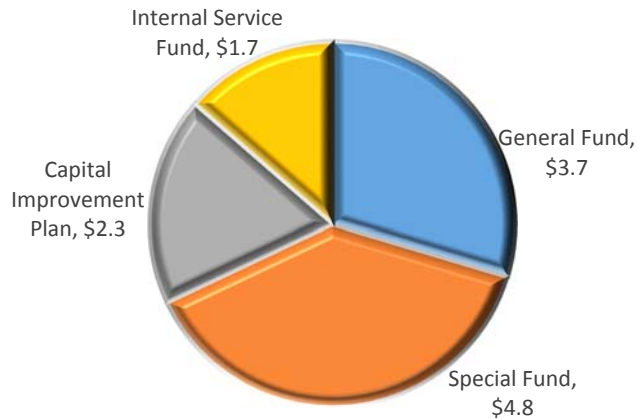
The Department is structured according to the following organizational chart:



Source: DEC Management

DEC's FY2015 budget consisted of the following:

DEC FY15 Budget (\$12.5 Million)



Source: Office of Budget and Strategic Planning

Fund	Amount	Description
General Fund	\$3.7 million	\$2.1 million- personnel, \$1.6 million-operating
Special Fund	\$4.8 million	800 MHz radio system financing, and new E-911 system implementation
Capital Improvement Plan	\$2.3 million	Design/engineering costs for renovation and expansion of 911 Emergency Communications Center
Internal Service Fund	\$1.7 million	Radio Shop maintenance, repair, and network management

OVERALL CONCLUSION

Based on audit procedures and observations, the auditors concluded that DEC provides services effectively and processes calls within established performance measures. The Department manages available staff effectively, however, an updated staffing analysis needs to be done to identify current staffing needs.

OBSERVATIONS AND RECOMMENDATIONS

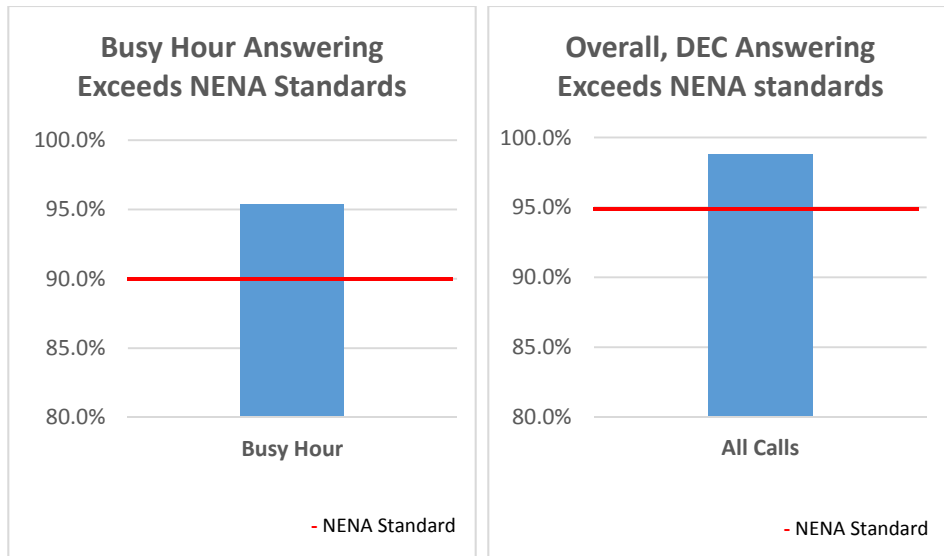
WHAT WORKS WELL?

Despite a high turnover rate in the Department (22.3% compared to the national rate of 17-19%), DEC staff is efficient in its call response time and is effectively delivering emergency communications services as depicted below:

CALL RESPONSE TIME EXCEEDS NATIONAL STANDARDS

Answering time for emergency calls is a critical measure in determining the effectiveness of DEC. When emergency situations occur, the speed of answering and dispatching calls matters the most. The National Emergency Number Association (NENA) is a professional organization that is solely focused on 911 policy, technology, operations, and education issues. The Association uses its efforts to provide effective and efficient public safety solutions, such as publishing recommendations for operational standards for communication centers.

According to NENA standards, 90% of calls must be answered within 10 seconds during the busy hour and 95% of all calls should be answered within 20 seconds. The busy hour is defined as the hour with the greatest call volume, which was 4:00 pm. In FY15, DEC answered on an average exceeding 68 calls per day at that time. DEC exceeded NENA standards by answering 95% of busy hour calls within 10 seconds, indicating that the Department's call center responds well under pressure. DEC was also able to answer 99% of all calls received at the 911 center within 20 seconds in FY15, which also exceeds the NENA standard.



Source: Auditor Prepared

After the call is answered, the Communications Officers have an average call event entry time of 18.54 seconds, which is the time it takes a Communications Officer to gather all the necessary information from the emergency call in order to send the call to a radio dispatcher for further emergency response. The average total processing time with event entry and dispatch was 34.17 seconds for FY15. Although, the auditor could not find any standard for total processing time, the current processing time exceeds DEC's internally developed goal of 90 seconds.

ABANDONED CALLS

As described before, DEC attends to emergency situations where the potential for compromising the health and safety of citizens exists. Immediately answering 911 calls is an obvious expectation of the citizens. If the calls are not answered, someone could potentially get hurt. These types of situations would lead to legal liabilities for the City. Therefore, answering 911 calls in a timely manner is necessary.

Abandoned calls are defined as 911 calls that are placed to the Richmond Emergency Communications call center, but the caller disconnects before the call is answered by a Communications Officer. The NENA standards target less than 5% of all abandoned calls over 20 seconds and less than 10% of abandoned calls over 10 seconds during the busy hour, as an acceptable performance goal. Auditors found that only 0.78% of all calls were abandoned during the audit period, indicating DEC's performance significantly exceeds NENA standards.

WHAT NEEDS IMPROVEMENT?

DEC also has some areas to be improved upon to make their operations more efficient and effective. Issues such employee satisfaction and a lack of updated policies and procedures need to be addressed.

STAFF SCHEDULING

DEC's 911 call center is a critical operation of the City of Richmond and must be available to provide emergency services 24 hours per day, seven days per week, and 365 days per year. This mandatory availability and readiness is met by scheduling Communications Officers in the call center at all times. The Communications Officers' schedule is made up of five shifts that are required to be staffed with 12 to 16 employees depending on the time of the shift and the day of the week. This staffing level is similar to the surveyed localities of similar population size (200k-250k residents) that had between 10 and 19 staff scheduled for their shifts. DEC employees are regularly scheduled based on a 12-hour work shift. Other surveyed localities in the Eastern United States were shown to have either 12-hour or eight-hour shifts.

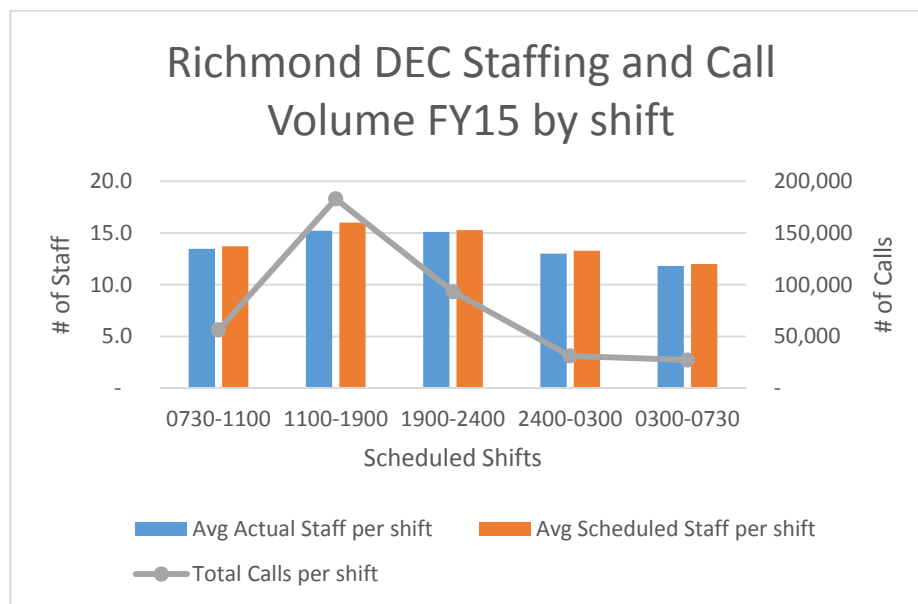
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In FY15, DEC received 390,799 calls in the 911 call center and the auditors found that almost half of all calls during the year (47%) occurred during the afternoon shift (11:00 am - 7:00 pm), when the highest number of Communications Officers were scheduled (16). Conversely, the graveyard shifts (Midnight - 3:00 am and 3:00 am - 7:30 am) had the fewest amounts of calls (8% and 7%, respectively) and also the lowest number of scheduled staff (13 and 12, respectively). Therefore, DEC's shift schedule shows a strong correlation between staffing level and call volume as depicted in the chart below:



Source: Auditor Prepared

The auditors' analysis revealed that it is possible to move some staff from the shift that has a lower call volume to the shift that has the highest call volume. The auditors found that average hourly call volume per Communications Officer for each shift is as follows:

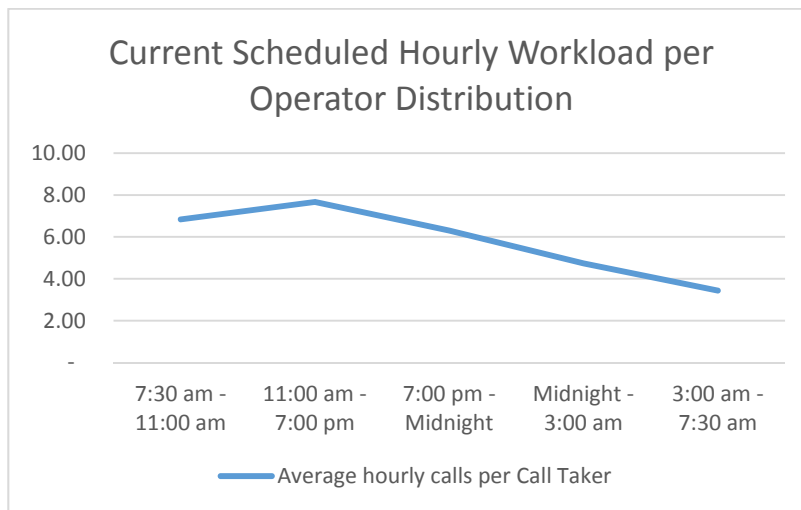
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	7:30 am - 11:00 am	11:00 am - 7:00 pm	7:00 pm - Midnight	Midnight - 3:00 am	3:00 am - 7:30 am
FY15 Call Volume	56,293	183,006	93,209	31,088	27,204
Number of Call Takers (avg.)	6.4	8.2	8.1	6.0	4.8
Average hourly calls per Call Taker	6.84	7.67	6.30	4.73	3.44



Source: Auditor Prepared

IMPACT OF RE-ALLOCATING STAFF

Based on the above calculation, it appears that there may be opportunity to move positions from the graveyard shifts to the afternoon shift to more evenly distribute the workload. This type of change may have the impact of reducing overtime during the higher workload shift. The Department can utilize any additional staff assigned to further reduce the mandatory overtime. Below is a depiction of the workload distribution based on the current schedule and a

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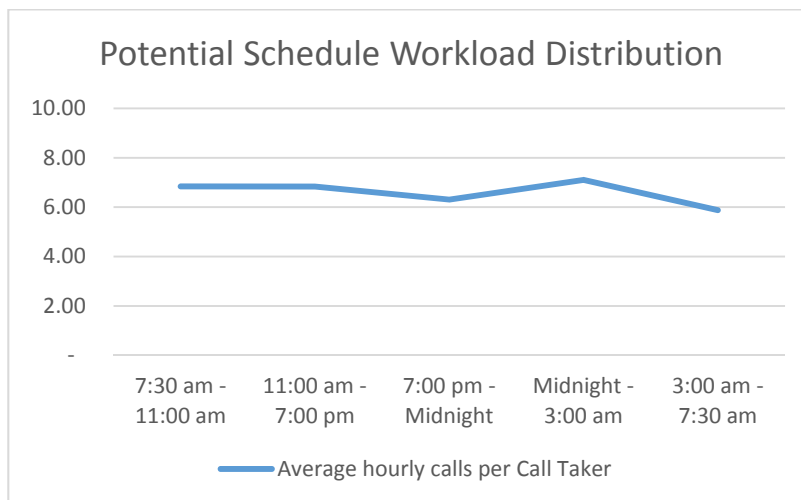
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potential schedule where one employee position was added to the afternoon shift and two employees were removed from each of the graveyard shifts¹:

	7:30 am - 11:00 am	11:00 am - 7:00 pm	7:00 pm - Midnight	Midnight - 3:00 am	3:00 am - 7:30 am
FY15 Call Volume	56,293	183,006	93,209	31,088	27,204
Number of Call Takers (avg.)	6.4	9.2	8.1	4.0	2.8
Average hourly calls per Call Taker	6.84	6.83	6.30	7.10	5.87



Source: Auditor Prepared

An evenly-distributed workload among the shifts can help reduce the amount of overtime that is currently needed to cover shifts with higher average workloads. Care should be exercised such that the above illustration is not interpreted as a recommendation for changes in staff levels. This illustration only depicts that there could be a positive impact of re-allocating staffing levels between the shifts.

¹ Graveyard shifts consist of Midnight to 3:00 am and 3:00 am to 7:30 am shifts.

According to DEC management, minimum staffing is based on a study completed in 2011 for the call center's staffing level. This study was not available for the auditors' review. It is not known if the study is currently relevant. According to this study, DEC needs to have 102 Communications Officers for proper staffing. However, DEC has been handling its current workload effectively with 80 Communications Officers. It is recognized that DEC accomplishes its assigned duties with mandatory overtime, which may have an adverse impact on costly employee turnover. It takes DEC approximately six months to train a Communications Officer before they can perform their job duties completely on their own. Therefore, alleviating the need for mandatory overtime may be necessary. This may require augmenting staffing in addition to making changes in staffing level per shift. DEC is requesting four additional positions for their operation in the FY17 budget.

The Association of Public-Safety Communications Officials (APCO) offers a set of tools known as "APCO Retains" that can be used to estimate appropriate staffing for the call center. This estimate is developed using a variety of pertinent information, such as workload. DEC has access to APCO Retains, but has not used the staffing estimator tool. In order to make a strong case for requesting additional employee positions, DEC needs to use a more scientific model, such as APCO Retains.

Recommendation

- 1. The CAO needs to require DEC to conduct a current staffing estimation using the APCO Retains staffing estimator tool.**

OPPORTUNITY EXISTS TO IMPROVE EMPLOYEE RETENTION

Employee retention is important for any organization, including DEC. According to the Society of Human Resources Management, "Employee departures cost a company time, money, and other resources. Research suggests that direct replacement costs can reach as high as 50%-60% of an employee's annual salary, with total costs associated with turnover ranging from 90% to 200% of annual salary." Loss of good DEC employees may result in reduced productivity and an adverse impact on citizen services. DEC invests up to six months of personnel costs in training and developing an employee. Losing such employees would result in a loss of these efforts plus the cost of having to hire and train a brand new employee. During FY15, DEC experienced a 22.3% employee turnover rate. This means that the workload must be handled by the remaining staff and management has to implement the largely-unpopular, mandatory overtime. This situation may lead to additional turnover.

Due to the high turnover rate in DEC, employees are asked to volunteer for overtime assignments in order to meet the minimum required staffing levels. Unfulfilled needs after accounting for volunteer overtime hours are met by assigning mandatory overtime. This directive is unpopular amongst DEC employees as 14 (61%) of 23 employees surveyed are not satisfied with it. However, mandatory overtime requirements are disclosed to DEC employees prior to employment.

The auditors reviewed overtime reports for FY15 and found that DEC employees had a total of 22,261 hours of overtime. Based on City administrative regulations and the Fair Labor Standards Act, overtime is paid at a rate of time and a half. A total of \$622,162.39 was paid out in overtime wages to DEC employees in FY15. Out of this total, six employees had a total overtime pay of \$20,000 or greater.

OPPORTUNITY TO IMPROVE EMPLOYEE MORALE

The Communications Officers operate in a high-stress work environment. The job itself is listed in Salary.com's top 10 most stressful jobs. In this environment, it may be important to periodically boost employee morale by improving working conditions. Management plays a significant role in impacting employee morale.

The auditors conducted an employee satisfaction survey to gather job satisfaction information from current Communications Officers. Management should pay attention to the responses relating to major issues affecting the employees.

The employees were generally positive regarding their 12-hour schedule, as it allows for consecutive days off and more weekends off per month compared to the previous 8-hour schedule. However, the following are areas where a significant number of employees were not satisfied. These concerns, if addressed, would result in improvement in morale of their workforce. Improved morale may result in retaining more employees for DEC.

Communications Officers are not satisfied with:

- Interactions with management
 - 59% of responding employees are not satisfied with the quality of their interactions with management.
- Management's response to errors
 - 62% of responding employees are not satisfied with the way management responds to errors in a constructive way.
- Management's interest in creating good working conditions

- 59% of responding employees are not satisfied with the interest management shows in creating good working conditions.
- Receptiveness of management to suggestions
 - 52% of responding employees are not satisfied with the receptiveness of management to employee suggestions.
- Ongoing training
 - 52% of responding employees are not satisfied with the appropriateness of the ongoing training that is provided.
- Involuntary overtime, unpopular but can be augmented with additional staff positions
 - 61% of responding employees are not satisfied with management's use of involuntary overtime.

Recommendation:

2. The CAO needs to require DEC to develop a plan to improve employee morale.

POLICIES AND PROCEDURES ARE NOT FINALIZED

According to the Government Auditing Standards, internal control, in the broadest sense, encompasses the agency's plan, policies, procedures, methods, and processes adopted by management to meet its mission, goals, and objectives. Internal control includes the processes for planning, organizing, directing, and controlling program operations. It also includes systems for measuring, reporting, and monitoring

**Internal Controls
over policies and
procedures need
improvement**

program performance. An effective control structure is one that provides reasonable assurance regarding:

- Efficiency and effectiveness of operations
- Accurate financial reporting
- Compliance with laws and regulations

Based on the audit test work, the auditors concluded that the policies and procedures are incomplete, but are in the process of being finalized. The incomplete written policies and procedures may lead to inconsistent job performance by employees. Also, policies and procedures are important to ensure the continuity of operations during employee turnover.

Since separating from the Police Department, DEC has started the process of becoming certified from the Commission on Accreditation for Law Enforcement Agencies (CALEA). During this process, DEC must update their policies and procedures to match the criteria required by CALEA's standards. DEC has practices in place for all critical functions of the Emergency Communications Center, but not all of those practices have been formally adopted by the Department as a part of their official Standard Operating Procedures (SOPs). The following DEC processes do not currently have a formal SOP written:

- Making and Handling Agency/Employee Complaints
- Quality Assurance Checks (currently in draft)

Recommendation:

3. The CAO needs to require DEC to finalize their policies and procedures to meet the CALEA standards, and ensure their effective communication to staff.

To provide a framework for DEC to restore essential functions in the event of an emergency that affects operations, DEC has created a continuation-of-operations plan (COOP). The DEC COOP program established procedures that address three types of disruptions:

- Loss of access to a facility (as in a fire);
- Loss of services due to a reduced workforce (as in pandemic influenza);
and
- Loss of services due to equipment or systems failure (as in information technology systems failure).

Henrico County's Department of Communications is an essential part of DEC's COOP. In the event of a loss of access to a facility, Henrico County's Division of Emergency Communications is the designated back-up Emergency Communications Center for the City of Richmond. All City calls for service will be received and dispatched from Henrico County's facility. However, the auditors discovered that there is no formal, written Memorandum of Understanding (MOU) with Henrico County. An active MOU agreement will help define each department's obligations and confirm their understanding of these obligations.

Recommendation:

4. The CAO needs to require the City of Richmond to obtain a formal written MOU from Henrico County addressing their role in the DEC COOP.

MANAGEMENT RESPONSE FORM
2016-08 DEC - Emergency Communications Audit

#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
1	The CAO needs to require DEC to conduct a current staffing estimation using the APCO Retains staffing estimator tool.	Y	<i>Using the APCO Retains staffing tools, DEC will assess current staffing needs and report back to the CAO. In addition, DEC will create a process in which staffing needs are assessed on an annual basis.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
			30-Jun-17
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
2	The CAO needs to require DEC to develop a plan to improve employee morale.	Y	<i>DEC plans to conduct quarterly town hall meetings to allow employees to provide direct feedback and solutions to the Department's Executive Team. Use 360 degree feedback surveys to illustrate support and encourage an atmosphere of continuous improvement and dedication to improving work conditions. Develop a Training Committee to advise and make recommendations for training to the Department's Training Unit.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
			30-Jun-17
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
3	The CAO needs to require DEC to finalize their policies and procedures to meet the CALEA standards, and ensure their effective communication to staff.	Y	<i>DEC was accepted into the CALEA certification process on 11/24/15 and has until 11/24/17 fulfill all CALEA requirements. DEC has assigned one manager to oversee the accreditation process and develop policies and procedures full-time to ensure compliance.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
			24-Nov-17
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION

MANAGEMENT RESPONSE FORM
2016-08 DEC - Emergency Communications Audit

#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
4	The CAO needs to require the City of Richmond to obtain a formal written MOU from Henrico County addressing their role in the DEC COOP.	N	<i>Unable to concur - This recommendation would require legislative action by City Council and Henrico County's Board of Supervisors. If it is determined to be the pleasure of the respective legislative bodies that a MOU is needed, DEC is willing to draft the necessary language to formalize this existing relationship, however; we can not concur with a recommendation requiring action outside our span of authority.</i>
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
			30-Jun-17
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION