

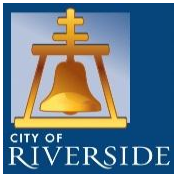
PERFORMANCE  
AUDIT

Riverside Fire  
Department

**Fire Prevention Division**  
**~ Managing**  
**False/Avoidable Fire**  
**Alarms**

**AU15-01**

Office of the City Manager  
Internal Audit Division  
Cheryl Johannes, Internal Audit Manager



## Internal Audit

# PERFORMANCE AUDIT ~ Summary

## Fire Prevention Division ~ False/Avoidable Fire Alarms

### Objective of Review

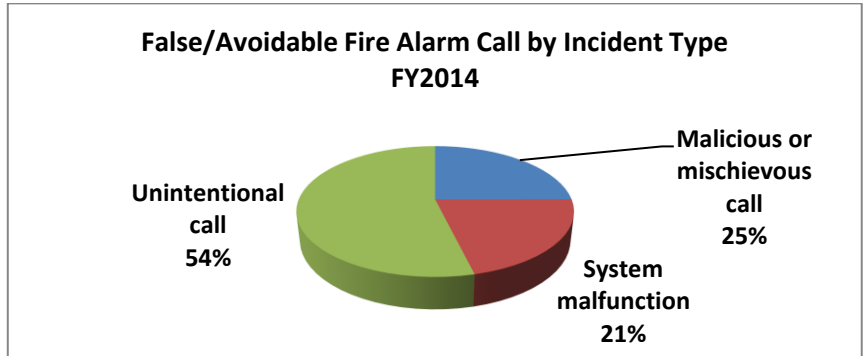
- Follow-up on invoicing and collection process for false/avoidable fire alarm penalty fees since our last review in February 2010 (AU10-06); and
- Assess current methods utilized to reduce the number of false/avoidable fire alarm incidents.

### Background

The Fire Department Suppression crews respond to all dispatched incidents. A completed report indicates incident type per codes established by the National Fire Incident Reporting System (NFIRS). If the crew responded to a false/avoidable alarm, a false alarm violation notice is issued to the property owner. The Fire Prevention Division reviews each false/avoidable alarm report and assess if a violation has occurred per RMC 5.59. If a penalty is to be assessed, the appropriate Billing Advice is manually prepared and sent to Accounting for processing (invoicing the property owner) and recording in the City's financial system. Accounting monitors past due invoices and forwards past due invoices to Collections.

Of the 28,628 fire incidents (per the NFIRS) in Riverside in 2013, 4% were categorized as a false/avoidable alarm. Excluding the number of EMS calls, the percentage of false/avoidable alarms is 13% for 2013. A significant number of responses to false/avoidable fire alarms are repeatedly to the same business/property.

While the direct costs of fire personnel, fuel, vehicle maintenance and the risk of vehicle collision and firefighter injury responding to a false/avoidable fire alarm is a factor, reducing the number of false/avoidable alarm responses ensures fire crews are not kept occupied on a non-emergency call when an actual fire or medical emergency occurs.



Based on our review, we recommend the Fire Department consider for approval the following changes to Riverside Municipal Code (RMC) 5.59:

- ***Assess a penalty fee as established by resolution of the City Council for third and subsequent false/avoidable fire alarms during a 365-day period for all facilities within the City's jurisdiction, including facilities occupied or operated by the state, county, school districts and other local public agencies.***
- ***To ensure compliance of with UL Certification, Electrical Testing Laboratories (ETL), and/or FM Approvals, the facility owner and/or alarm user should be required to submit appropriate documentation and specifications of alarm system upgrades (service/repair report) to the Fire Marshal or designated representative within 15 calendar days of the fifth false/avoidable alarm response within a 365-day period. Failure of the alarm system owner and/or user to complete such upgrades/repairs within the specified 30 calendar days should result in a Fire Inspection, applicable fee and a possible legal citation.***
- ***Establish Positive Alarm Sequence (PAS) policy/procedures, to include an application and related annual PAS operational permit and fee for eligible structures that meet specific conditions of approval per the City Fire Marshal or designee.***

## OBJECTIVE, SCOPE and METHODOLOGY

In accordance with the Internal Audit Work Plan for FY2014/15, we have completed a review of the Fire Department's Fire Prevention Division management of false/avoidable fire alarms. The objective of the review was to:

- Follow-up on recommendations noted in the February 2010 (AU10-06) audit; and
- Assess current methods utilized to reduce the number of false/avoidable fire alarms received; specifically address alternatives to reduce the number of repeated alarms at businesses/properties.

Our review, which was conducted during the months of August and September 2014, covered false fire alarm incident data for the calendar year 2013 and the first six months of 2014 (18 months in total). Prior year's data was utilized for trend analysis. We relied upon the following to assess the overall incident response strategy, risk and financial processes in planning for our review:

- Research material and literature from various sources – National Fire Protection Association, National Fire Incident Reporting System;
- Riverside Fire Department Standards of Operation – SOP 2.04, 2.14 and 2.15;
- Riverside Municipal Code 5.59 and Resolution No. 21583;
- False fire alarm practices and penalty fees of other US cities for comparison;
- Discussions with and documents/data from the Deputy Fire Chief, Administration Deputy Chief and the Fire Marshal; and
- Data from the City's financial system, IFAS.

## BACKGROUND



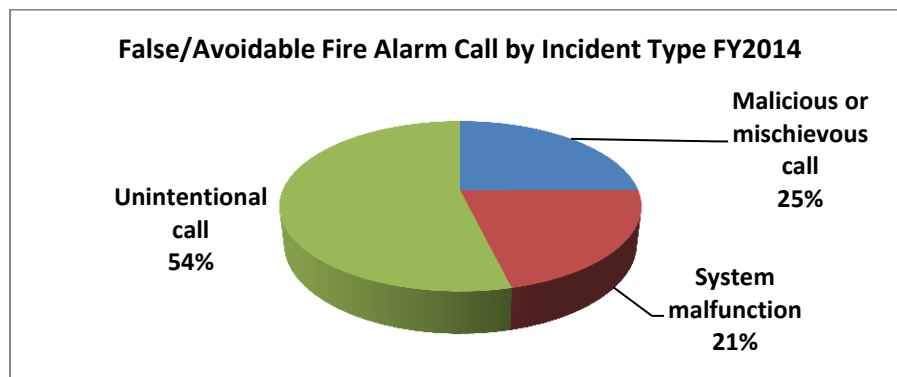
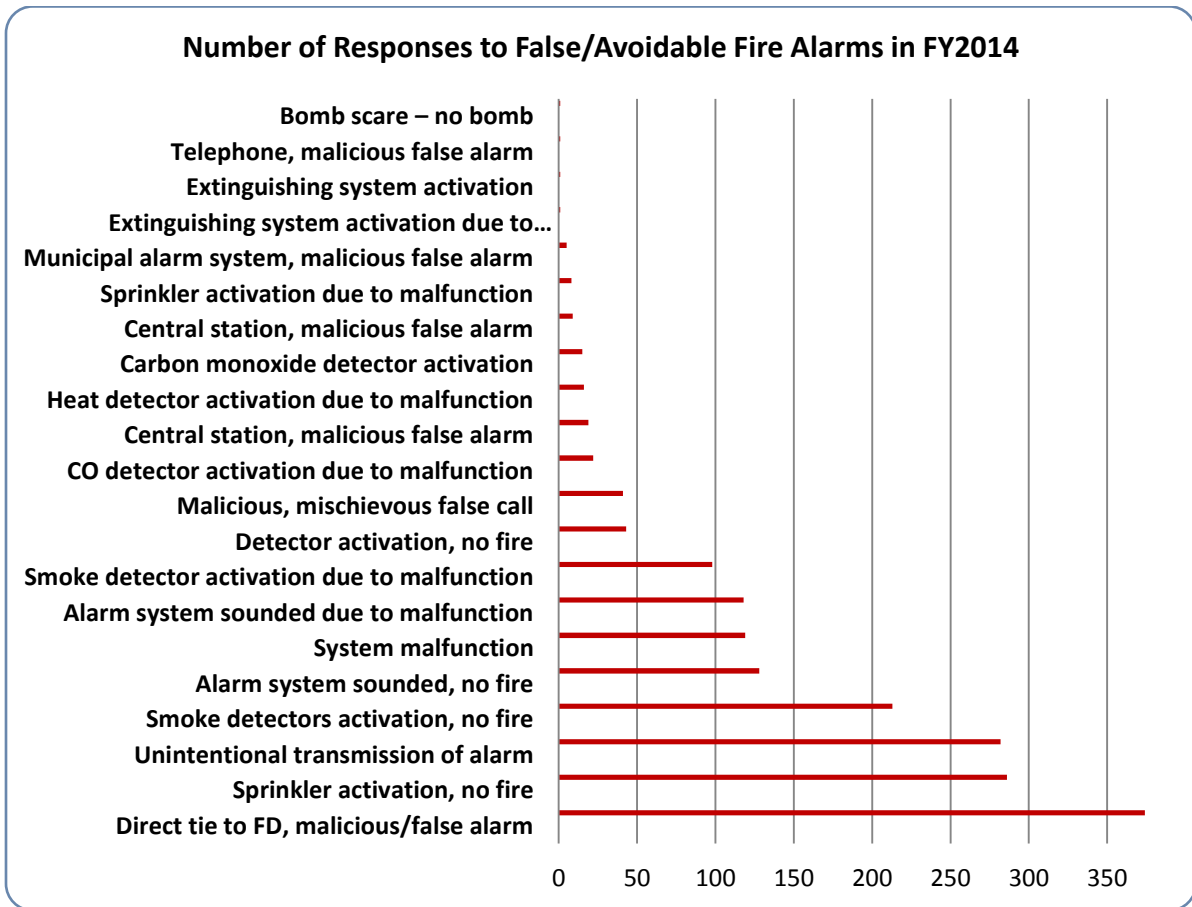
Installed automatic fire detection systems provide an early warning in the event of a fire, saving lives and limiting property damage. In 2012, public fire departments responded to 1,375,000 fires in the United States, according to data the National Fire Protection Association (NFPA) received from fire departments responding to its *2012 National Fire Experience Survey*. Of the total fire alarms to which fire departments responded to in cities similar to Riverside's population, approximately 6.6 percent are unwanted.<sup>1</sup> An unwanted alarm is defined by *NFPA 72®*, *National Fire Alarm and Signaling Code*, as "any alarm that occurs that is not the result of a potentially hazardous condition." These "unwanted" alarms are commonly referred to as "false" or "avoidable" alarms. Riverside Fire Department false/avoidable fire alarm incidents<sup>2</sup> are twice the national average.

	FY 2011	FY2012	FY2013
<b>Reported Fire Incidents</b>	<b>8,544</b>	<b>8,802</b>	<b>8,798</b>
<b>False Alarm Incidents</b>	<b>1,016</b>	<b>1,072</b>	<b>1,156</b>
	<b>12%</b>	<b>12%</b>	<b>13%</b>

<sup>1</sup> Refer to APPENDIX A

<sup>2</sup> Source: NFIRS - Riverside Fire Department Incident Report for 2011, 2012 and 2013.

The activation of a fire alarm system, not by fire or hazard, but through careless use, technical failure, equipment malfunction, improper installation or negligence of the property owner which requires an immediate response by the Fire Suppression crew is a costly misuse of fire crew and equipment resources. When fire crews are responding to a false/avoidable fire alarm, they are not available to immediately respond to legitimate fire/life safety incidents. The chart below indicates the number of responses in FY2014 by the Riverside Fire Suppression crews by category.



Refer to *APPENDIX B* for detail numbers by fire code category.

False/Avoidable Fire Alarm Penalty Invoices

During FY2014, 175 invoices for false fire alarms were processed, totaling \$119,210 in accounts receivables. At fiscal 2014 year end, the outstanding (unpaid) balance was \$27,253.

Facilities/businesses with more than four (4) false/avoidable fire alarms within 365 days and related fees invoiced in FY2014 for the excessive number of alarms are noted in the following table.

ACCOUNT	False Alarms	Billed \$	Unpaid \$
Riverside Comm Hospital	14	12,180	3,480
Grandview Manor	8	5,620	5,107
Sunrise Assisted Living	5	2,660	1,390
Galleria at Tyler	10	8,700	0
Lowes #1048	7	4,750	3,480
The Palms Apt.	8	6,960	870
La Sierra Univ	10	7,830	0
Quad Graphics	10	7,360	0
Forever 21 Hqtrs	9	7,830	7,830
Kaiser Permanente Hospital	30	25,230	3,480

Per Section 5.59.080 (A) of the Municipal Code, penalties for recurring false/avoidable fire alarms are currently *not assessed* against facilities occupied or operated by the state, county, school districts or other local public agency. The Fire Department responded to the following false alarms in FY2014:

Public Facility	# Incidents
North High School	7
Calif School for the Deaf	9
City Hall	7
Riverside County Sheriff	5
Riverside County Courthouse	7
MLK High School	7
Bright Futures Academy	8
RCRMC Psychiatric Care	4

Cost for the Fire Department to respond to numerous false/avoidable fire alarms from these government and public facilities is currently not recovered through penalty fee assessments. The cost is fully absorbed by the Department/General Fund.

## OBSERVATIONS and RECOMMENDATIONS

As noted in our prior audit of February 2010, the process to review each false fire alarm incident to determine if the property/business should be invoiced (according to Riverside Municipal Code 5.59 and Resolution No. 21583) is manual and time consuming. In our review we noted “clusters” of invoices for repeat accounts (i.e., Riverside Community Hospital, Lowes, Cal Baptist, La Sierra University, QUAD Graphics, and Kaiser Hospital) processed throughout the fiscal year 2014. Time between the reported false alarm incident date and invoice processing date appears to be problematic. ***We recommend the Division review the complete process to determine if there is a personnel resource issue and/or a bottleneck in the various process steps, and take action to invoice accounts more timely. Consider utilizing the FIREHOUSE application to streamline the review and billing process.***

While the direct costs of fire personnel, fuel, vehicle maintenance and the risk of vehicle collision and firefighter injury responding to a false/avoidable fire alarm is a factor, reducing the number of false/avoidable alarm responses ensures fire crews are not kept occupied on a non-emergency call when an actual fire or medical emergency occurs.

***Based on our review, we recommend the Fire Department consider presenting for approval the following changes to RMC 5.59:***

- Hospitals, large shopping malls, university housing/shopping complexes, schools (public and private), County buildings, assisted living/senior care facilities, and food establishments account for the majority of repeated false/avoidable fire alarms. Per MC section 5.59.080 (A), penalties “...shall not apply to facilities occupied or operated by the state, county, school districts, or other local public agency.”

***Assess a penalty fee as established by resolution of the City Council for third and subsequent false/avoidable fire alarms during a 365-day period for all facilities within the City’s jurisdiction, including facilities occupied or operated by the state, county, school districts and other local public agencies.***

- Many repeated false/avoidable fire alarms at commercial facilities are due to technical failure, equipment malfunction or improper installation. If a facility has more than five false/avoidable fire alarms within a 365-day period, the alarm equipment must be UL Certified, FM approved or ETL certified. For example, the Underwriters Laboratories (UL) Certificate of Service includes a field examination of installations and records, as well as field tests of service response. Service and signal handling records, the alarm system installation, and the operating procedures are examined to address the main sources of fire alarm system problems. Certification also verifies code compliance, improves accountability, ensures signals are dispatched properly and that systems are repaired, tested and maintained.

***To ensure compliance of with UL Certification, Electrical Testing Laboratories (ETL), and/or FM Approvals, the facility owner and/or alarm user should be required to submit appropriate documentation and specifications of alarm system upgrades (service/repair report) to the Fire Marshal or designated representative within 15 calendar days of the fifth false/avoidable alarm response within a 365-day period. Failure of the alarm system owner and/or user to complete such upgrades/repairs within the specified 30 calendar days should result in a Fire Inspection, applicable fee and a possible legal citation.***

- There may be situations when it is not warranted to have a general fire alarm sound throughout an entire building. *Section 23.8.1.3 of NFPA 72* permits what is referred to as a positive alarm sequence (PAS). PAS systems are delayed alarms under specific controlled conditions that eventually default to a full general alarm. In a PAS system, system activation must be acknowledged electronically by “...trained personnel to acknowledge an alarm at the control panel within 15 seconds and then have up to 180 seconds to evaluate the situation and reset the system. If the signal is not acknowledged within 15 seconds, if the system is not reset within 180 seconds (3 minutes), or if a second detector or initiating device is activated, the notification signals sound and remote signals are immediately activated.”

Use of a PAS system should be approved by the Fire Marshal or designee for eligible structures that meet specific conditions and have adequately trained onsite personnel. A PAS Operational Permit should be issued upon approval of the PAS application, and renewed annually. A permit fee should be required at time of initial approval and at each annual renewal.

***Establish Positive Alarm Sequence (PAS) policy/procedures, to include an application and related annual PAS operational permit and fee for eligible structures that meet specific conditions of approval per the City Fire Marshal or designee.***

## CONCLUSION

A review of the reported incidents for 2013 per the National Fire Incident Reporting System (NFIRS) by the Riverside Fire Department indicates that the Department responded to 28,628 calls. Of the total number of responses to incidents, 1156 (4%) were for false/avoidable fire alarms. If EMS calls are excluded from the total, the response to false/avoidable fire alarms in 2013 was 13% of the total.

False/avoidable fire alarms caused by a person acting with malice; due to mechanical failure, improper installation, lack of proper maintenance; or by a legitimate cause other than an uncontrolled fire situation, such as smoke from cooking, heavy steam from a shower or accidental activation of a panic button on an alarm panel places an unnecessary financial and resource burden on fire operations. Responding to false/avoidable fire alarms increases the risk that fire crew will not be available for true emergency calls.

Changes to RMC 5.59, as recommended in our report, should increase business/property owner accountability; ensure corrective measures are implemented to reduce the number of repeated false/avoidable alarms. Implementing a Positive Alarm Sequence (PAS) system for eligible structures that meet conditions of approval should reduce the number of false/avoidable fire alarms requiring fire crew response, while reducing the risk for potential injury to occupants from a large scale evacuation, and avoiding unnecessary disruption of an event.

During the course of our review we discussed various aspects of false/avoidable fire alarms with the Deputy Fire Chief and Fire Marshal. A draft of this report was provided for clarification, comment and feedback prior to finalization. No formal response to this report is required.

We extend our appreciation to the Fire Department and staff that assisted us during this operational assessment.

-Cheryl Johannes, Internal Audit Manager

## AUDITING STANDARDS

Our review was conducted in accordance with the *Standards for the Professional Practice of Internal Auditing* of the Institute of Internal Auditors. Those standards require that the audit is planned and performed to afford a reasonable basis for judgments and conclusions regarding the department, Division, program, activity or function under review. An audit also includes assessments of applicable internal controls and compliance with requirements of laws and regulations when necessary to satisfy the audit objectives. We believe our audit provides a reasonable basis for our conclusions.



## APPENDIX A

Percent of Fires and Nonfire Incidents by Community size, 2010-2012 Average

Community Size										
	1,000,000 or more	500,000 to 999,999	250,000 to 499,999	100,000 to 249,999	50,000 to 99,999	25,000 to 49,999	10,000 to 24,999	5,000 to 9,999	2500 to 4,999	under 2,500
Fires	4,300	2,525	1,113	509	222	114	65	35	24	12
Rescue, EMS etc.,	137,341	78,484	23,461	11,443	4,643	1,895	879	320	129	42
False alarm responses	15,998	5,563	2,328	1,150	554	276	120	53	16	7
Mutual aid responses	3,517	992	564	333	191	126	87	55	29	13
Hazardous materials	1,268	855	324	169	82	50	25	10	3	1
Other hazardous	2,067	1,271	710	298	154	85	45	20	8	3
All other responses	19,561	12,698	6,704	2,542	1,051	427	182	78	29	7
Total for all incidents	184,051	102,388	35,203	16,444	6,897	2,973	1,403	571	240	84
	1,000,000 or more	500,000 to 999,999	250,000 to 499,999	100,000 to 249,999	50,000 to 99,999	25,000 to 49,999	10,000 to 24,999	5,000 to 9,999	2500 to 4,999	under 2,500
Fires	2.3%	2.5%	3.2%	3.1%	3.2%	3.8%	4.6%	6.2%	10.1%	14.5%
Rescue, EMS etc.,	74.6%	76.7%	66.6%	69.6%	67.3%	63.7%	62.7%	56.1%	53.9%	49.8%
False alarm responses	8.7%	5.4%	6.6%	7.0%	8.0%	9.3%	8.5%	9.3%	6.8%	8.0%
Mutual aid responses	1.9%	1.0%	1.6%	2.0%	2.8%	4.2%	6.2%	9.6%	12.2%	15.4%
Hazardous materials	0.7%	0.8%	0.9%	1.0%	1.2%	1.7%	1.8%	1.8%	1.3%	1.2%
Other hazardous	1.1%	1.2%	2.0%	1.8%	2.2%	2.8%	3.2%	3.4%	3.4%	3.4%
All other responses	10.6%	12.4%	19.0%	15.5%	15.2%	14.3%	13.0%	13.6%	12.2%	7.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: NFPA's Survey of Fire Departments for 2012 U.S. Fire Experience

### Estimates of False Alarms by Type, 2012

	Estimate	Percent Change From 2011	Percent of All False Alarms
Malicious, Mischievous False Call	167,500	-8.2	7.5
System Malfunction	713,000	-4.7	31.9
Unintentional Call	1,044,500	-1.6	46.6
Other False Alarms (Bomb Scares, etc.)	313,500	-19.8	14.0
Total	2,238,000	-6.1	

## APPENDIX B

### City of Riverside Fire Department

#### Number of Responses to False/Avoidable Alarms

Category 700s for the period July 1, 2013 thru June 30, 2014 (FY2014)

#		Description of Category
41	710	Malicious, mischievous false call
5	711	Municipal alarm system, malicious false alarm
374	712	Direct tie to FD, malicious/false alarm
1	713	Telephone, malicious false alarm
19	714	Central station, malicious false alarm
9	715	Central station, malicious false alarm
1	721	Bomb scare – no bomb
119	730	System malfunction
8	731	Sprinkler activation due to malfunction
1	732	Extinguishing system activation due to malfunction
98	733	Smoke detector activation due to malfunction
16	734	Heat detector activation due to malfunction
118	735	Alarm system sounded due to malfunction
22	736	CO detector activation due to malfunction
282	740	Unintentional transmission of alarm
286	741	Sprinkler activation, no fire
1	742	Extinguishing system activation
213	743	Smoke detectors activation, no fire
43	744	Detector activation, no fire
128	745	Alarm system sounded, no fire
15	746	Carbon monoxide detector activation

Source: RFD VisionFIRE database

The following definitions, according to the 2013 edition of NFPA 72, for the above are:

**Malicious or mischievous alarm** – an activation of an alarm initiating device caused by a person acting with malice;

**System malfunction** – an activation of an alarm initiating device caused by mechanical failure, improper installation, lack of proper maintenance; and

**Unintentional alarm** – an activation of an alarm initiating device by a legitimate cause other than an uncontrolled fire situation, such as smoke from cooking, candles and fireplaces; heavy steam from a shower; or accidental activation of a panic button on an alarm panel.