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Is the Stockton, California Fire Department learning from past incidents?

Post Incident Analysis for the SFD

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CERTIFICATION STATEMENT

I hereby certify that 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.

Signed: _____

Abstract

The Stockton Fire Department (SFD) recently experienced the largest residential fire in its history. The problem is there is a limited post incident analysis (PIA) process in place. This can hinder the analyzing of incidents to determine if there exists a need for training improvements, recommendations for future changes, or enhancing staff development.

The purpose of this research is to identify PIA models and criteria for the SFD. Action research was the method utilized to answer the following research questions:

1.) What types of PIA models currently exist?

2.) What types of PIA models and criteria are used by similar sized departments?

3.) What PIA model and criteria should the SFD utilize?

The procedures used to conduct the research consisted of information from nationally recognized standards for PIA's, PIA guidelines received from several fire service agencies, published EFOP ARP's, journal articles, procedure manuals and books. In particular, resources obtained through NFPA, USFA, FEMA and ISFTA proved invaluable in conducting this research.

Results indicated operational improvements were hampered by the current SFD PIA process. The author further concluded the current SFD procedure for incident critiques did not reflect optimal performance measures and was lacking in several key areas including not meeting national standard compliance, not being formatted in a comprehensive manner, lacking a routine process, and lacking check lists to ensure all relevant information is collected for proper analyzing.

The author provides recommendations in the form of a proposed PIA policy, a comprehensive and standardized PIA checklist, a PIA cover sheet, and an incident response questionnaire to enhance the continued safety and operational effectiveness of the SFD.

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Introduction

The SFD recently experienced the largest residential fire in departmental history, fueled by high winds which exhausted all available resources for the community (Thigpen, 2008). The problem is there are limited PIA guidelines in place to accurately evaluate significant incidents such as these for determining the need for improvements, recommendations for future changes, or the enhancement of staff development. Currently the SFD has a limited PIA process in place which consists of a written policy. The policy does not contain comprehensive guidelines of what to evaluate or identify key areas which should be the subject for continued review. In addition, due to its present format, applicable national standards were not being followed and several key areas to be considered were routinely not analyzed.

The purpose for this applied research project (ARP) was to identify PIA models and criterion for post incident critiques utilized by other fire service organizations to benefit the SFD.

Action research was the method utilized to answer the following research questions:

1). What types of PIA models currently exist?

2). What types of PIA models and criteria are used by similar sized departments?

3). What PIA model and criteria should the SFD utilize?

In addition, several fire service agencies across our nation were contacted and asked to submit their formal PIA policies and forms for comparison. Agencies were chosen based on their similar size and call volume to the SFD, like emergency response capabilities, or their history of having significant responses from which to learn. The PIA Request Letter is found in *Appendix B.* The author's goal is to enhance current SFD operations by drafting a policy containing PIA guidelines for future significant incidents which in turn will enhance the overall safety for our

community. Utilizing lessons learned through the PIA process helps to fulfill one of the five operational objectives of the United States Fire Administration (USFA) by helping communities develop comprehensive all-hazard risk reduction plans (United States Fire Administration [USFA], 2008). Applied research was utilized to conduct this ARP. The research indicated there are significant criteria to be evaluated on incidents and many other organizations have PIA policies in place which can effectively accomplish the needs of the SFD. In addition, the SFD could benefit from a review of the current critique procedure. By utilizing national standards, a comprehensive format for PIA and establishment of modified procedures, the operational effectiveness of the SFD can benefit significantly.

Background and Significance

The SFD responds to over 42,000 incidents annually (Stockton Fire Department [SFD], 2007). Of these, approximately 770 are reported structure or building fires (SFD, 2007). The department currently maintains a Class 1 City rating from the Insurance Services Office (Insurance Services Office [ISO], 2008) and protects a population in excess of 350,000 (City of Stockton [COS], 2007) within the city limits and through contractual agreement with four county fire districts. Current configuration of the department is thirteen engine companies, four truck companies, divided between two battalion districts with authorized on-duty strength of 76 members (SFD, 2007). Since 1976, the Emergency Medical Service (EMS) (SFD, 2007) level provided is Advanced Life Support (ALS) with all front line engine companies staffed daily with two paramedics (Brady, 1991). The SFD operates out of thirteen stations with a three platoon system rotating on the 48/96 work schedule.

The SFD also maintains specialized response capabilities to include the following which are crossed staffed daily with on-duty engine and truck company personnel:

1.) Hazardous Material Response Team

2.) Technical Rescue Team (High-angle rope, trench and confined space)

3.) Swift Water and Dive Rescue Team

4.) Tactical Emergency Medical Support (TEMS) Team

The background for this ARP was a fire which began in the northwest portion of the city on June 10, 2008 (Thigpen, 2008). At approximately 10:45 in the morning, a report of a grass fire burning alongside of Interstate 5 was received at the SFD Emergency Communications Dispatch (ECD) Center. Several other reports were also received and these additional notifications reported structures were also burning in the area. Within eleven minutes of the first alarm, all on-duty SFD resources were dedicated to this incident. Included in the response were 76 on-duty SFD personnel, numerous staff chief officers, call-back of all available off-duty personnel from the other two shifts, and the mutual aid assistance of eight other San Joaquin County fire departments. It is estimated over 185 SFD personnel assisted on this incident. The fire would eventually reach an unprecedented general alarm status and significantly tax the SFD (Thigpen, 2008).

Once the fire was declared under control several hours later, a total of thirteen homes and 20 condominiums were destroyed and 11 others sustained moderate to significant fire and smoke damage (Thigpen, 2008). Fortunately, no serious injuries or deaths occurred to either civilians or responding firefighters. The fire was given the name of the *Grizzly Incident* and has subsequently been referred to as such (Rodriguez, 2008). Immediately following the incident, the fire chief convened a group of SFD staff officers and members to begin an investigation into the incident. The investigation was to include all facets of the SFD emergency response, mitigation efforts, communications, training needs and recommendations for future changes.

To accomplish this directive from the fire chief, the group of SFD staff initiated a complete analysis of the incident and in the future will provide recommendations with timelines to be shared with city staff and the public. While starting the incident review process, the current system in place was not designed to incorporate the myriad of information needed to accurately perform a thorough evaluation of all aspects of an incident of this magnitude. The need for the SFD to update the current PIA structure to enhance operational capabilities and provide a framework for future policy changes became apparent. For the lessons learned to be effectively applied to future operations, clear and concise PIA procedures must be in place. Utilizing a knowledgeable PIA process will allow the SFD to fulfill the operational objective of the USFA by developing comprehensive all-hazard risk reduction plans for our community (USFA, 2008).

To date, the overview of the incident has been completed. *Appendix A* includes the SFD Grizzly Incident Overview. In the past, a policy was in place for critiques to be utilized for all greater alarm incidents (SFD, 2001). Based on its current configuration, the SFD PIA Process did not include mechanisms to sufficiently provide considerations for improvements, enhancements, and changes for training current and future SFD staff. Moreover, the current policy did not contain a standardized format nor did it identify critical components or specific key areas to be reviewed. *Appendix C* contains the current SFD PIA Policy. A foundation for analyzing significant incidents was in place, yet it lacked key components and direction to be effective to analyze lessons learned. These incomplete areas formed the basis of this research.

The significance of this research for the SFD is to analyze PIA processes from other national organizations, perform a thorough literature review of obtainable material concerning PIA and factor changes needed for response changes and recommendations based on a thorough evaluation of all aspects of bringing such a large incident under control. These changes will

assist the SFD with establishing criteria for PIA and reflect a move towards adopting national standards as a foundation for the PIA process. The significance to the SFD will be realized through enhanced operational effectiveness and improved future training for all SFD members.

Literature Review

A literature review was performed to identify and analyze pertinent content on the subject of PIA. The literature reviewed included nationally recognized standards policies, comprehensive PIA checklists received from numerous national fire service organizations, PIA guidelines, published Executive Fire Officer Program (EFOP) Applied Research Project's (ARP), journal articles, procedure manuals and books. As terminology may vary concerning the PIA process, for the purpose of this research, PIA shall include any reference to critiques, incident critiques, post incident reviews or after-action reports.

The current SFD Procedures Manual contains an article providing for an automatic fire critique process administered by the Division of Training (SFD *Procedures Manual*, 2001). Although the process is outlined with concern to who administers it, which companies will participate, and the timelines for completion of the critique, it does not contain specific criteria to be evaluated (SFD, 2001). Such deficiency can hamper future response effectiveness and future development of the organization. In reviewing the various national standards, The Federal Emergency Management Administration (FEMA) believes the post incident critique is one way to bridge the gap for organizational improvement by conducting routine after-action reviews. (Federal Emergency Management Administration [FEMA], 2008).

National Fire Protection Association (NFPA) Standard 1500, Fire Department Occupational Safety and Health Program (2002), mandates that all departments establish requirements and standards for post incident analysis for incidents involving serious injury or

death to a fire fighter (National Fire Protection Association [NFPA], 2002). In addition, NFPA 1561, Standard on Emergency Services Incident Management System, states the incident safety officer (ISO) shall be involved in the PIA process (NFPA 1561, 2008). Including key incident command personnel from the incident ensures focused analysis of the incident priorities, reported changes, and captures the critical thinking process performed on scene (NFPA 1561, 2008).

In *Hazardous Materials, Managing the Incident* (Noll et al., 1995), the Occupational Safety and Health Administration (OSHA) mandates critiques be performed following the conclusion of mitigating efforts on hazardous material responses by fire service organizations. The focus of this ARP will be to develop a PIA process with reference to lessons learned for future response improvements by incorporating national standards as a foundation for the process. As the PIA process differs from organization to organization, applying the principles of national standards to PIA provides a distinct measure from which to form a foundation. As an example, the California Emergency Medical Services Authority (CEMSA) has mandated EMS providers collect, analyze, and perform a Quality Improvement (QI) process to enhance the delivery and quality of EMS (California Emergency Medical Services Authority [CEMSA], 2002).

The basic principles for QI are based on the work of Dr. W. Edwards Deming, who specialized in statistical process control (Fellers, 1992, pg. 172). A principle of his which seems to be at the heart of all PIA processes relies on this notion of improvement to be a constant and forever system for production and service which ultimately improves quality and productivity (Fellers, 1992, p. 173). Using this analogy as a foundation, it becomes clear to have any PIA

process designed to be on-going, orchestrated for continual updating, and flexible for continuous improvement (CEMSA, 2002).

In researching PIA processes, the author contacted several national fire service agencies which were chosen based on their similar size and call volume to the SFD, had like emergency response capabilities, or had a history of significant responses. Table 1 outlines the various departments contacted and if complete PIA information was available.

Table 1

Fire Department PIA Information

Fire Department	PIA information complete?
Contra Costa County, CA	Yes
Eureka, CA	Yes
Fire Department of New York, NY	No
Horry County, SC	Yes
Lenexa, KS	Yes
Modesto, CA	No
Philadelphia, PA	Yes
Prince William County, VA	Yes
St. Petersburg, FL	Yes

Of the departments contacted, most had various forms of a PIA process in place. The underlying theme was similar to the SFD in that a critique process had evolved from a written procedure (SFD, 2001). More than half of the fire agency documents contained a comprehensive checklist to assist the researcher in determining what was accomplished, identify if any critical

tasks had been omitted or overlooked, and a section for additional comments from responders to be further analyzed. Based on this research, deficiencies with the SFD PIA process could be updated and expanded upon.

In researching EFOP ARP material on the PIA process, the author noted that seven were written within the last five years. Of these, three outlined the basic criterion to be included in the PIA process and detailed policy changes from their research to effect positive change within their organizations. Bryan Ward (2003) outlined his literature review in themes based on crucial elements to be included in an effective PIA process. The review included interviews with nationally recognized authors and heavy emphasis on adopted standards (Ward, 2003). Ward identified in his research the content of a PIA should include routine analysis of incidents and emphasis on following national standards (Ward, 2003).

Sebastian Wong (2004) differed with his research in that a study was utilized to see if QI principles were being performed on fire service incidents similarly to the critique process performed on EMS incidents which were adopted by the CEMSA (CEMSA, 2002). His research also questioned whether national standards were being followed effectively for his organization (Wong, 2004). Wong's research found that a QI approach to PIA could be problematic as the fire ground poses rapid changes which could be difficult to analyze using QI modalities (Wong, 2004). Each of these ARP's differed in their research approach; however, the underlying theme provided for effective change within their respective departments.

Carlos Castillo (2001) correlated his research to focus on developing operational guideline improvements as a result of the culmination from lessons learned through an effective PIA process. His findings helped to identify critical components which were not performed on incidents such as poor radio communications, command staff operating outside of the Incident

Command System (ICS), and span of control issues (Castillo, 2001). His research incorporated these mechanisms into a PIA process to ensure safe and effective operations in the future. By utilizing a comprehensive and thorough PIA process, his research indicated this would enhance fire ground effectiveness and provide for future optimal staff development (Castillo, 2001).

The Journal of Emergency Medical Services (JEMS) provided an excellent framework for models and criteria necessary for an effective PIA process. Isaacs (2008) developed a system of evaluation and subsequent action plan for EMS services provided by the Dallas Fire & Rescue (DFR) Texas, Department. In his work, a committee of fire department members, doctors, nurses and administrators from DFR's partnered agencies was formed to assist with analyzing a broad spectrum of DFR's activities. Review processes such as these, although designed for EMS (Brady, 1991) can be effectively utilized for all fire service activities (Isaacs, 2008).

One model of PIA involves conducting case studies. These are formulated critiques which take into consideration pre-existing factors from the scene such as building construction, alarm notifications and environmental issues which can affect both the on scene mitigation efforts as well as lessons learned. Bachman (2005) wrote in Fire Engineering that these factors are critical for the effective evaluation in the PIA process. He further states incidents should be reviewed even if responders feel the situation went well. In his review, Bachman asserts waiting or delaying performing a PIA can be counterproductive when there are issues concerning the emergency response and can mask safety and/or performance issues. This can be improved if the PIA process was performed routinely by responding personnel which lends familiarity and consistency by those involved (Bachman, 2005). By routinely conducting a PIA, personnel become accustomed to the process and communications are enhanced as thoughtful and creative ideas can be aligned into positive procedural change for organizations.

The research of Steven Kidd (2001) somewhat differed from this approach and closely follows the recommendations of the International Society of Fire Service Instructors (ISFTA) (International Society of Fire Service Instructors [ISFTA], 1999). Kidd (2001) believed in conducting both on-site reviews immediately following the incident and formal critiques several days later. He believed conducting on-site reviews promotes them as a routine process, and they become automatic as part of the response to incidents. As a second part, the after action review can encourage team members to examine their actions on a more critical level especially in analyzing what works and what does not. This analogy helps to promote goodwill in the PIA process whereby personnel feel comfortable in its execution and not intimidated by the methods used to incorporate any identified remedies (Kidd, 2001).

While conducting the literature review on the subject of PIA's, two general conclusions were identified both in the literature itself and in the PIA procedure formats from the contacted fire service organizations. First, the critique process, in any form it is conducted, should be administered in a non-threatening manner with no emphasis on blame towards any of the on-scene personnel (Bachman, 2005). This ensures an open process yet still identifies any key areas for improvement. Secondly, any lessons learned should be communicated to all members of the organization, not just those who responded. Sharing of vital information, including lessons learned, with all members begins the thought process of change which can be formally introduced through new operational procedures and/or enhanced training methods (Isaacs, 2008).

In summarizing the literature review of the PIA process, the adopted guidelines should focus on several common themes. First, the process should be open, productive, and without individual blame for any actions or omissions from the incident (Bachman, 2005). Secondly, the lessons learned need to be communicated effectively to all members of the organization, not just

those who responded (Isaacs, 2008). This vital sharing of critical key elements can improve safety. When identifying a model or format for PIA, several excellent national standard references exist including those available from the USFA, NFPA, FEMA, and the ISFTA (NFPA 1500, 2002.; FEMA, 2008; USFA, 2008; NFPA 1561, 2008; Noll et al., 1995). While conducting this research these components were found throughout the PIA policies received from the various fire service organizations.

The research indicates the SFD can benefit from existing nationally recognized PIA standards and the current PIA process could be modified to enhance lessons learned for determining the need for future operational improvements, recommendations for change, and the enhancement of staff development. Performing a thorough PIA process will improve fire ground safety for responders and the community of Stockton through an upgraded review process which is open, comprehensive, national standard compliant, and contains checklists identifying key areas for review as its foundation.

Procedures

Action research was utilized to identify information available on PIA processes and to provide answers for the three research questions. The literature review began in August 2008 with identification of previous ARP's written on the PIA process through the National Fire Academy's (NFA) library, the Learning Resource Center (LRC) (USFA, 2008). In developing material to research, the author utilized sources from nationally recognized standards for PIA's, and PIA guidelines and procedures received from several national fire service agencies. Organizations were chosen based on their similar size and call volume to the SFD, had like emergency response capabilities, or had a history of significant responses which could be learned from. In addition, published EFOP ARP's through the NFA concerning the PIA process, journal

articles, procedure manuals and books were utilized. In particular, resources obtained through NFPA, USFA, FEMA and ISFTA proved resourceful in conducting the research.

One published ARP focused research on implementing a QI process for conducting PIA's with emphasis on checklists and adoption of national standards (Wong, 2004). The focus of this research by Wong was to analyze a traditional PIA format to include QI methodology. Although valuable in its content, the author chose not to pursue this method for a PIA as part of the procedures performed (CEMSA, 2002). The procedures performed indicated a basis of PIA was formed from the QI process. It is consistent as both methods end in improvements to both process and content as constructed by Dr. Fleming (Fellers, 1992, p. 173). In essence, PIA has a foundation through QI.

Upon completing the literature review, the author began to focus on the first research question of what types of PIA models currently exist. To assist with this answer, numerous fire service agencies were contacted and asked to provide information of their PIA policies, procedures, or guidelines. Of the 13 agencies contacted, nine submitted research information which identified several varied forms of an adopted PIA process. In addition, they were asked to submit examples of their PIA process. These were sent electronically and the author individually analyzed each for content, comparisons, and common themes. These PIA models obtained provided the answer to research question one.

The second research question asked what types of PIA models and criteria are used by similar sized departments. To accomplish this, the author used nationally adopted criteria from NFPA, USFA, FEMA and ISFTA to identify basic information which should be evaluated and to identify a template for the PIA process. In addition, the submissions received from the various departments were compared to national standards by the author to ensure compliance with the

adopted standards and to further the review of accurate PIA content. This allowed the author to formulate changes which could be beneficial for the SFD. Once the various types of models and specific criteria were evaluated from the agencies, the author compiled components from them with national standards into a draft format to establish a basic form for possible future use by the SFD.

The third research question focuses on what PIA model and criteria the SFD should utilize. The research concluded with varied PIA components from the respondent agencies, and recognized national standards which should be in place for the PIA process to be effective. These were incorporated into a draft document which answered the third research question and provided a potential new format to be incorporated into improving the operational objectives of the SFD. The research performed by the author for this topic assisted greatly with identifying shortcomings with the present SFD PIA process.

There were some limitations to the literature review process for this research. Limitations were encountered from the material received by the agencies contacted. Not all of the respondents clearly identified what specific areas should be evaluated nor were national standards adopted by all (USFA, 2008). For example, some placed general focus areas into their procedure or guidelines where others crafted comprehensive checklists of key areas with comment sections for further evaluation if needed. The author found when a checklist of key pre-determined criteria to be evaluated was part of a PIA process; thoroughness and pre-identified specific areas could not be overlooked. The information gathered by this research was not representative of the fire service as a whole.

Agencies had their PIA process evaluated based on their similar size and call volume to the SFD, had like emergency response capabilities, or a history of having significant responses

from which lessons learned established significant change for their organization and the fire service as a whole. The author found an effective PIA process is one which is on-going and consistently reviewed.

Definition of Terms

ALS: Advanced Life Support includes all basic life support care to also include invasive measures such as intravenous and pharmaceutical therapy, and the use of ventilation devices (International City Managers Association [ICMA], 1988, p. 348).

ARP: Applied Research Project; research project submitted as a requirement of the Executive Fire Officer Program (USFA, 2008).

BLS: Basic Life Support is generally limited to airway maintenance, ventilatory support, CPR, splinting fractures, spinal injuries, and first aid (ICMA, 1988, p. 348).

CEMSA: California Emergency Medical Services Authority, state regulatory authority for California's EMS System (California Code of Regulations [CCR], 2000).

DFR: Dallas Fire & Rescue, City of Dallas, Texas Fire & Rescue Department (Isaacs, 2008).

DOT: Division of Training, department responsible for SFD training (Stockton, 2001).

EFOP: Executive Fire Officer Program, premier training program of the USFA (USFA, 2008).

EMS: Emergency Medical Services is a complex health care system of personnel, equipment, and resources (Brady, 1991).

FEMA: Federal Emergency Management Administration, national department responsible for disaster response, training and assistance (USFA, 2008).

HCFD: Horry County Fire Department fire service agency responsible for Conway, SC.

ICS: Incident Command System, nationally adopted incident management system (ICMA, 1988).

ICP: Incident Command Post location at which primary command functions are executed (Model Guide, 2003, p. 101).

ISFTA: International Society of Fire Service Instructors, organization devoted to establishing training standards for the fire service (ISFTA, 1999).

ISO: Incident Safety Officer is responsible for safety at an emergency incident (Fire Chief's Handbook, 1995, p. 285).

ISO: Insurance Services Office collects data on municipal fire protection efforts for rating (ISO, 2008).

JEMS: Journal of Emergency Medical Services national magazine dedicated to EMS issues (JEMS, 2008).

LRC: Learning Resource Center, research center for the National Fire Academy (USFA, 2008).

NFA: National Fire Academy, official training location for the United States Fire Administration (USFA, 2008).

NFPA: National Fire Protection Association, national organization dedicated to reduce burden of fire by providing codes, standards, research, training & education (NFPA, 2008).

OSHA: Occupational Safety and Health Administration promotes the safety and health of America's working men and women (OSHA, 2008).

PIA: Post Incident Analysis, process for reviewing emergency incidents for evaluating lessons learned (NFPA, 2008).

PFD: Philadelphia Fire Department fire agency responsible for Philadelphia, PA.

QI: Quality Improvement is the method of evaluation for EMS (CCR, Section 100400, 2002).

RIC: Rapid Intervention Crew rescues fire department members (Fire Chief's Handbook, 1995, p. 298).

SFD: Stockton Fire Department fire agency responsible for City of Stockton, CA.

SOG: Standard Operating Guidelines, statement indication of outline to determine correct future courses of action (National Volunteer Fire Council [NVFC], 2008).

Results

Research question 1. What types of PIA models currently exist? In studying the differing models of PIA in existence, the author utilized documents received from various fire service organizations and compared them to adopted national standards concerning PIA. The standards indicated a PIA should be conducted without blame to anyone present on the incident in question (Kidd 2001), there should be two separate critiques to include an informal one after the incident has concluded followed by a formal one soon after (ISFTA 1999), and recommendations should be shared with all members of the organization (NFPA 1561, 2008).

Research question 2. What types of PIA models and criteria are used by similar sized departments? Specific criteria differed from each department and the various national standards. As an example, Philadelphia Fire Department (PFD) placed emphasis on the PIA process through a procedure format (Philadelphia Fire Department [PFD], 2003) while the Horry County, South Carolina Fire Department (HCFD) included significant pre-determined checklists with key areas to be evaluated and the addition of comment sections (Horry County, South Carolina Fire Department [HCFD], 2003). Some agencies incorporated NFPA 1561 which mandates incident safety officer involvement with the PIA process (NFPA 1561, 2008). Other organizations placed greater emphasis on standards from NFPA 1500 and performed critiques

only when significant injuries and/or fatalities occurred to firefighting personnel (NFPA 1500, 2002).

Table 2 illustrates the marked differences within organizations, their adoption of national standards, and frequency for performing PIA.

Table 2

FD PIA Comparison

Department	Follows National Standard	Critiques significant incidents	Frequency
Co. Co. County, CA	Yes	No	Not Reported
Eureka, CA	Yes	No	Varied
FDNY, NY	Yes	Yes	Infrequent
Horry County, SC	Yes	No	Routinely
Lenexa, KS	No	No	Routinely
Modesto, CA	No	Yes	Infrequent
Philadelphia, PA	Yes	No	Varied
Prince William County, VA	Yes	No	Not Reported
St. Petersburg, FL	Yes	No	Varied

As Table 2 illustrates, a majority of departments perform a PIA during significant incidents such as greater alarms, near miss situations or when unusual scene conditions were present. Based on these results, the author found when organizations closely follow adopted national standards and have clear and concise checklists in place for performing the PIA process, overall results were enhanced as opposed to procedures or guidelines which did not include these

parameters as part of a PIA. The results indicated a PIA process with these criterions as their basis was superior to the current SFD process and assisted the author with identifying this deficiency.

Research question 3. What PIA model and criteria should the SFD utilize? Results indicated organizations which utilize standards identified within NFPA 1561 and NFPA 1500, which states incidents are to be reviewed which have the greatest potential for reducing injury and death rates for firefighters and civilians in the future, have greater success with their PIA process (NFPA 1561, 2008).

In addition, when criterion includes processes established by ISFTA, a comprehensive analysis can be performed as key areas are thoroughly investigated and outcomes are optimal for adopting future change (ISFTA 1999). Safety plays a critical role in evaluating incidents. OSHA places critique mandates for fire departments that respond and mitigate hazardous material incidents (Noll et al., 1995). Carlos Castillo (2001) focused his research on critiques being utilized to develop operational guideline improvements from lessons learned through an effective PIA process. The results assist in identifying critical components not performed on incidents and also incorporate needed mechanisms to ensure safe operations in the future. The overall sense of this research in answering question three is to pre-determine criteria which are common to be evaluated and expand from there to areas more focused and determined.

Action research was performed to provide answers to the three research questions and develop results for the SFD. Through this research, the author concluded the current SFD PIA process was not sufficiently comprehensive, did not follow established national standards, and was performed infrequently resulting in a lack of operational improvements for the SFD. Results concluded that staff development was hampered by this and key information was not being

communicated to the organization as a whole. In addition, safety areas were missed which could result in significant firefighter injury and/or death if not evaluated properly in the future. Additional results found operational improvements could not be made without a complete and comprehensive PIA process in place (NFPA 1500, 2002). The author concluded the current SFD procedure for PIA did not reflect optimal performance measures and was lacking in these key areas. As a result of these factors, the author has drafted a new and comprehensive PIA process for the SFD to include the following parameters:

1. Conforms to applicable national standards (NFPA, FEMA, USFA, and OSHA)
2. Identifies all key areas for comprehensive evaluation (safety, operations, etc.)
3. Develops a checklist format for close monitoring and thorough analysis of an incident
4. Performs two critiques; first is informal and occurs immediately after the incident, the second is formal within the next on-duty period, if allowable
5. Provides training to SFD staff on performing the PIA process
6. Provides information and lessons learned to all SFD members for staff development and enhanced training
7. Develops future operational guidelines based on evaluations of incidents

Appendix D through H contain the proposed SFD PIA procedure, SFD checklist procedure, cover sheet, incident response questionnaire, and response checklist for staff personnel.

Discussion

The current SFD procedure for incident review was researched to see if it conformed to national standards and if improvement was necessary (SFD, 2001). Numerous national standards

outline criteria for consideration when organizing a PIA process. FEMA extensively outlines PIA criterion and states gaps are bridged when the process is utilized (FEMA 2008). The NFPA standards of safety, NFPA 1500, incorporate PIA as a safety factor and the logical conclusion in incident management to potentially reduce hazards (NFPA 1500, 2002). NFPA 1561 mandates the inclusion of the incident safety officer (ISO) to provide key insight during the PIA process (NFPA 1561, 2008).

OSHA mandates critiques are performed following the conclusion of mitigating efforts on hazardous material responses by fire service organizations which also follow safety as the common priority for a PIA process (Noll et al., 1995). Some organizations performed a QI process analyzing all aspects of incident response when utilizing PIA (Wong, 2004). While more comprehensive, the author chose to focus on what currently is utilized by other fire service organizations and follow national standards as the focus of this research. Thus, the QI process was not further researched (CEMSA, 2000). Principles of QI have been adopted nationally and do serve to enhance operational capabilities as they are incorporated into the basic foundation of PIA (Fellers, 1992, p. 173).

The research incorporated prior PIA EFOP ARP's. The first by Ward (2003) based his review on the crucial elements of a PIA process. His review utilized interviews with prominent fire service authors and emphasized adopting national standards as the foundation for a PIA process (Ward, 2003). Secondly, Wong (2004) directed his research to compare principles of QI (Fellers, 1992, p. 173) for incident review similar to the requirements of CEMSA (CEMSA, 2000). His research also looked into national standard compliance for the PIA process. Thirdly, Castillo (2001) correlated his focus to develop operational guideline improvements from lessons

learned through an effective PIA process. The author agreed with their research principles with exception to focusing on QI.

The framework for PIA models looked into the work of Isaacs (2008) who developed a system for evaluation and subsequent action plan for DFR. Although largely EMS focused, the plan can be implemented to other fire department responses effectively and serves to focus on a team approach for the PIA process. Bachman (2005) wrote in Fire Engineering that waiting to perform a PIA hampered the effectiveness of the process. By routinely conducting PIA's, personnel will become accustomed to the process and communications enhanced to facilitate any needed operational changes culled from the PIA (Bachman, 2005).

The research of Kidd (2001) differed and follows the recommendations of ISFTA (ISFTA, 1999). Kidd believed in performing two critiques on incidents: the first, upon immediate completion of the incident and is informal, the second, in a more formal setting, shortly after the incident but examining it in greater detail (Kidd, 2001). The author found this process to further promote openness and acceptance for personnel as a PIA would be welcome and not thought of as potentially intimidating in its approach or as disciplinary in nature.

During the research, the author compared this study to the findings of others. Several key points were found. First, the structure should closely follow adopted national standards and format. By using safety as a framework and foundation, guidelines specified within NFPA and FEMA should be the basis for any PIA process (NFPA 1500, 2002). Secondly, the PIA process should be open and viewed in a positive fashion to facilitate discussions from members to accurately identify focused areas for any improvements (Bachman, 2005).

Thirdly, comprehensive checklists were found to assist with achieving optimal results from a PIA. Organizations which incorporated these into their process were able to clearly

identify areas for improvement to enhance future operational development of their staff (HCFD, 2003). Ward (2003) believed in identifying these crucial elements to assist organizations with developing any recommendations for future use. The author believes a comparison of the many varied PIA processes provided the framework for selecting a PIA process best suited for the needs of the SFD and these crucial elements were incorporated into the proposed procedural changes.

The author evaluated the results of the research by comparing information culled from numerous fire department PIA procedures. In doing so, each was outlined into common practices and further compared to national standards for thoroughness and observation of identified key elements. Key elements were topics directly related to safety, proper incident command system (ICS) usage, and active communications during the incident which need consistent evaluation (ICMA, 1988). Further evaluation indicated checklists provided an excellent framework as the foundation for assuring accurate review and to maintain accountability and consistency of the process (HCFD, 2003).

In discussing the results of this research, several implications were found. Each of these has significant benefits for the SFD. Primarily, the current SFD PIA process is basic and inconsistent. It does not have an orderly format, there are no established criterions for evaluation, and the frequency for conducting a PIA is not routine (SFD, 2001). The research has indicated PIA processes are being performed by other organizations consistently while closely following national standards. In addition, comprehensive checklists have been identified as useful tools for establishing consistent critiques with the assurance that key areas are not overlooked. In essence, the research has identified significant benefits for the SFD.

The benefits for the SFD can be summarized into procedural, operational, and training. The current procedure should be updated based on the research analysis. A checklist of criterion should be included to allow for a thorough PIA. Lessons learned, once communicated to all members, can be placed into Standard Operation Guidelines (SOG) to further expand safe operations for any future incident (NVFC, 2008). Once SOG's are approved and established, enhanced training can be initiated throughout the organization. The training may take the form of company level in-service sessions or multi-company drills involving all members under the supervision of the SFD Division of Training (Division of Training, [DOT]).

Recommendations

After a concise review of the information obtained through this research the author recommends the SFD modify its existing PIA policy to provide a more detailed process for incident review in the future (SFD, 2001). National standards require incidents to be reviewed for all hazardous material responses which are mitigated, significant incidents, and injuries or fatalities to responders and/or civilians (NFPA 1500, 2002; FEMA, 2008; USFA, 2008; NFPA 1561, 2008; Noll et al., 1995). Based on the formats researched from other fire service organizations PIA processes, the SFD should adopt a comprehensive checklist to ensure all relevant information is received, reviewed, and evaluated (Kidd, 2001).

Upon review of existing PIA models used throughout the fire service, specific policies must be in place to ensure any issues and lessons learned are communicated to all members of the SFD (Castillo, 2001). The author recommends the SFD adopt this format to include reference to all applicable national standards (NFPA 1500, 2002; FEMA, 2008; USFA, 2008; NFPA 1561, 2008; Noll et al., 1995) and utilize an informal and formal PIA process to invoke routine

recognition with line personnel (Bachman, 2005). *Appendix D* contains the proposed SFD PIA Policy.

Currently, the SFD does not perform PIA consistently. The research indicated when organizations implement routine review for incidents, the process is greatly accepted by personnel, becomes a useful tool for applying lessons learned, and assists in the adoption of future changes to policy, training standards, and SOG's (Isaacs, 2008). The proposed SFD PIA Checklist Policy is *Appendix E*. The research further indicated models and criteria adopted from other organizations utilizing routine practice for PIA enhanced operational capabilities and improved safety on incidents. *Appendix F* is the proposed PIA cover sheet. In analyzing which model and criteria the SFD should adopt, the author recommends a hybrid from the various fire service organizations which were researched as part of this ARP (PFD, 2003, HCFD, 2003). The proposed adopted changes would include all applicable national standards (NFPA 1500, 2002 ed.; FEMA, 2008; USFA, 2008; NFPA 1561, 2008; Noll et al., 1995), utilization of both informal and formal processes (Bachman, 2005), provide lessons learned to all members (Castillo, 2001), and employ a comprehensive checklist format to ensure all relevant information is accurately reviewed each time (Kidd, 2001). The proposed SFD Response Questionnaire is found in *Appendix G*.

The author believes the recommendations in this research are attainable and the proposed changes to the current policy can be implemented for future enhancement to the SFD's training, operations, and safe practices. For any new PIA process to be effective, it must continually be reviewed for content, operational effectiveness, and applicability. *Appendix H* contains the SFD Response Checklist.

Future readers may wish to further these study results with additional focus in the QI process. PIA may be enhanced with the utilization of greater principles of QI through the work of Dr. Deming (Fellers, 1992, p. 173). As PIA does follow the basic principles of QI, future study efforts can be explored to include developing a format for incident review similar to existing requirements of the CEMSA provisions for EMS QI (CEMSA, 2002). The author believes a study in this area would continue to improve scene management, safety, and further lessons learned to increase future staff development.

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Appendix A

SFD Grizzly Incident Preliminary Report

MEMORANDUM

September 19, 2008

TO: Ronald L. Hittle, Fire Chief
Lance Calkins, Deputy Fire Chief

FROM: Ed Rodriguez, Division Chief

SUBJECT: **QUAIL LAKES "GRIZZLY" INCIDENT OVERVIEW**

The following is a brief preliminary report of activities from the operations and Emergency Communication Division (ECD) for the Grizzly Incident of June 10, 2008. As has been reported earlier, an archive study has found that this incident was the largest residential fire in the City of Stockton's history and the largest single commitment of resources to an incident in the history of the SFD with 96% of on-duty personnel (1 Engine Company (E12) not dispatched) responding to assist.

Emergency Operations

1. SFD response consisted of the following:

- 12 Engine Companies
- 4 Truck Companies
- 2 Battalion Chiefs
- Chief's Operator (Mobile Command Post)
- All on duty staff captains, division chiefs, deputy chiefs and chief of the department, over 84 personnel initially responded
- Call back of over 65 SFD off-duty personnel
- Call back of SFD Auxiliary Members(Est. 20)
- Utilization of SFD recruit academy (10 recruits, 3 instructors) for suppression activities

2. 9 county engines called to provide citywide coverage. Mutual Aid coordination implemented utilizing the task force concept. Many responded to additional Stockton emergencies (fires and EMS incidents)
3. 4 reserve Engine Companies and 1 reserve Truck Company placed in service within 45 minutes
4. Fires contained within 1 ½ hours of the initial notification. Unprecedented based on their size, number of structures burning and the widespread areas of involvement
5. 2 firefighters sustained minor injuries. 4 civilians sustained minor injuries and smoke inhalation. No fatalities
6. Unprecedented response and assistance from the SPD. Assisted with evacuations, traffic control and unified command functions. Mobile Command Post was established to coordinate all ICS functions
7. SFD responded to an additional 33 incidents during this event, including 3 reports of additional unrelated fires. One fire was located on Malvern Court, a residential triplex with the garage fully involved causing extensive damage and a second fire located at West Lane and Hammer Lane which was a roof fire.
8. SFD assisted County fire agencies with mutual aid on another grass fire threatening structures
9. 20 condominiums and over 13 single family residences extensively damaged or destroyed

- 1st Alarm assignment - 10:27:12
- 2nd Alarm assignment - 10:39:42
- 3rd Alarm assignment - 10:48:18
- 4th Alarm assignment - 10:48:34
- All off-duty Fire Department personnel paged
- Mutual Aid requested from Woodbridge, Waterloo-Morada, Thornton, Manteca, Lodi, Linden-Peters, Lathrop-Manteca, Tracy and Ripon Fire Departments to cover SFD Stations - approximately 11:00 hours

A comprehensive post incident analysis will be conducted and will include a thorough review of all aspects of the SFD's efforts in mitigating this incident. Please do not hesitate to call upon me if you need additional information or clarification.

ED RODRIGUEZ
DIVISION CHIEF
EMS/SPECIAL OPERATIONS

ER:mtr

Appendix B

PIA Request Letter

Dear Fire Service Professional:

I am currently enrolled in the United States Fire Administration's (USFA) Executive Fire Officer Program (EFOP) administered through the National Fire Academy. As part of the program, I am required to complete research to enhance the operational capabilities for my organization, the City of Stockton, California Fire Department and the fire service as a whole. I am requesting you provide any and all information relative to your organizations Post Incident Analysis (PIA) Process. Please provide any of the following information

1). PIA Policy, procedure or Standard Operating Guideline (SOG)

2). PIA Checklist, questionnaire or template

3). Adoptive national standards which your organization uses as a basis for your PIA process

4). Any other information you believe could be helpful with this research topic

Please respond electronically to the following e-mail address: Ed.Rodriguez@ci.stockton.ca.us

If you prefer, you can mail all information to:

Stockton Fire Department

C/o Ed Rodriguez

425 N. El Dorado Street

Stockton, CA 95202

Ed Rodriguez, Division Chief
Stockton Fire Department

Appendix C

Existing SFD Policy

PROCEDURES MANUAL

ARTICLE: F

SECTION: 1A

SUBJECT: AUTOMATIC FIRE CRITIQUE

POLICY

It is the policy of the Stockton Fire Department to critique greater alarm fires and other significant incidents in order to provide learning opportunities which may lead to changes in existing policies.

PROCEDURE

A critique of significant incidents will be held on the next on-duty weekday of the appropriate shift, whenever possible. ***If at all possible,*** the critique will take place within three shifts of the incident.

To ensure continuity and uniformity, the critique will be administered by the Director of Training or the Deputy Chief of Operations. In their absence, the Deputy Director of Training shall administer the critique.

The battalion chief who commanded the incident will be part of the critique "team" to offer his comments, observations, and recommendations.

A. The critique will be held at either Company 2 or Company 4, whichever is more appropriate, based on the location of the incident.

B. The critique will be scheduled for 1000 hours unless scheduling conflicts arise. In these cases, a time shall be agreed upon and companies notified as early as possible.

1. All affected on-duty officers are required to attend.

2. **Attendance at a critique should be limited to the Director of Training, the Deputy Chief of Operations, the IC of the incident, the company officers who responded to the incident, and/or additional SFD personnel as approved by SFD Administration.**

C. The notes from the critique will be sent to all companies to ensure that every firefighter has a chance to learn from these experiences.

D. In addition to these formal critiques, battalion chiefs are encouraged to hold informal critiques in their own battalions following significant incidents.

W. GARY GILLIS
FIRE CHIEF

Appendix D

Proposed New SFD PIA Policy

PROCEDURES MANUAL

ARTICLE: F

SECTION: 1

SUBJECT: POST INCIDENT ANALYSIS

POLICY

It is the policy of the Stockton Fire Department to critique, through a Post Incident Analysis (PIA) greater alarm fires, other significant incidents, or upon the request of the fire chief in order to provide learning opportunities which may lead to changes in existing policy and/or Standard Operating Guidelines.

PURPOSE

To provide consistent direction for established critique criteria and provide a format for future training culled from the lessons learned. To ensure continuity and conformity with established national standards.

PROCEDURE

The intended results of the PIA will be obtained by the gathered information and will be used in the following manner:

1. Evaluate current training programs or identify training needs
2. Evaluate current policies and procedures
3. Identify safety issues
4. Prioritize future planning needs
5. Identify equipment issues/concerns

6. Exchange of information other agencies and the public
7. Maintaining open communications to analyze new or proven methods

PIA Types

1. Informal: A PIA of significant incidents will be held upon completion of the incident by the Incident Commander (IC). This form of critique is generally informal but serves to provide a quick analysis of the incident and provide a format for a more formal critique at a later date. The IC will assign a scribe to ensure the exchange of feed back has been accurately recorded.

2. Formal: A structured critique attended by all responding officers and administered by the SFD Division of Training. If at all possible, this PIA will be held within three shifts of the incident. The procedure is as follows:

A. The PIA will be held at either Company 2 or Company 4, whichever is more appropriate, based on the location of the incident.

B. The PIA will be scheduled for 10:00 hours unless scheduling conflicts arise. In these cases, a time shall be agreed upon and companies notified as early as possible.

    1. All affected on-duty officers are required to attend.
    2. Attendance at a PIA should be limited to the Director of Training, deputy Chief of Operations, the IC, company officers who responded, and/or other SFD personnel as approved by SFD Administration.

C. The notes, lessons learned and future operational considerations will be communicated to all SFD personnel to ensure everyone has a chance to learn from prior experiences.

D. The PIA will closely follow the assigned checklist to ensure all safety, communication, and operational concerns are communicated.

E. The process will be non-judgmental and blame will not be assigned to any SFD member. Participants are encouraged to freely share information amongst the group.

F. Examples of significant incidents include but are not limited to the following; technical rescues, Level 2 or greater Haz/Mat responses, surface/sub-surface water rescues, TEMS operations and upon the request of the fire chief.

RONALD L. HITTLE
FIRE CHIEF

Appendix E

Proposed SFD PIA Checklist Policy

PROCEDURES MANUAL

ARTICLE: F

SECTION: 1A

SUBJECT: POST INCIDENT ANALYSIS CHECKLIST

POLICY

It is the policy of the Stockton Fire Department to utilize a checklist when performing a Post Incident Analysis (PIA) of greater alarms and other significant incidents. Division of Training staff will ensure its completion as part of the official record of each PIA proceeding.

PURPOSE

To provide a consistent format of PIA and to accurately assess key areas for further evaluation.

PROCEDURE

The Director of Training or his/her designee will ensure a completed checklist is filled out as part of the PIA process.

CHECKLIST COMPONENTS

1. The PIA Checklist will consist of a PIA Cover Sheet identifying the incident and pertinent response information. See attached sample PIA Cover Sheet.
2. All PIA's will have a Response Questionnaire completed during the formal process phase. The Director of Training or his/her designee will be responsible for ensuring the accuracy and completion of this document. See attached sample SFD Response Questionnaire.

3. PIA's will have a SFD Response checklist completed for each incident review. See the attached sample SFD Response Checklist.

Any questions concerning the PIA process can be directed through channels to the SFD Division of Training.

RONALD L. HITTLE
FIRE CHIEF

Appendix F

SFD PIA Cover Sheet

PIA COVER SHEET

INCIDENT NO._____ LOCATION: _____

DATE: _____ TIME OF ALARM: _____ WEATHER: _____

OCCUPANCY TYPE: _____

BUILDING CONSTRUCTION: _____

BLDG. SIZE: ____ x ____ NO. STORIES: _____ ROOF: _____

ALARMS: _____ ENGINES: _____ TRUCKS: _____ BATTALIONS: _____

SAFETY OFFICER: _____ SPEC. EQUIPMENT: _____

STAFF: _____ CAUSE: _____ LOSS: _____

IC: _____ OPERATIONS: _____

DIVISIONS: _____ _____ _____ _____ _____ _____ _____ _____ _____

GROUPS: _____ _____ _____ _____ _____ _____ _____ _____ _____

INJURIES: _____ FATALATIES: _____ CLOSE CALLS: _____

OPERATIONAL MODE: OFFENSIVE _____ DEFENSIVE _____

INCIDENT PLAN/OBJECTIVES: _____

TACTICS: _____

SAFETY CONCERNS: _____

UNIQUE ISSUES: _____

LESSONS LEARNED: _____

Appendix G

SFD Incident Response Questionnaire

SFD INCIDENT RESPONSE QUESTIONNAIRE

Incident Type: _____

Incident Location: _____

Incident No. _____ Incident Date: _____

1. What were the roles/ assignments on this incident?

2. What aspects of the operation went well?

3. What aspects of the operation need improvement?

4. What issues could be resolved through modifications of existing policy or SOG?

5. What issues could be resolved through modifications of our existing training program?

6. What safety issues were present?

7. What safety issues were not adequately addressed?

8. Were there communication issues?

9. Were there issues with equipment?

10. Other comments/feedback?

Appendix H

SFD RESPONSE CHECKLIST

ICS ESTABLISHED: _____ ICP DESIGNATED: _____

TAC. CHANNEL DESIGNATED: _____ ISO ASSIGNED: _____

RIC ASSIGNED: _____ PRI/SEC. SEARCH: _____

AIR CHECKS: _____ VENTILATION: _____

P G & E: _____ SPD: _____ WATER: _____

UTILIITES: _____ SAFETY: _____

COMMUNICATIONS:

CLEAR: _____ MISSING: _____

INJURIES: (FF) _____ CIVILIAN _____

DEATHS: (FF) _____ CIVILIAN _____

(Answer yes/no or N/A to the above)