

Developing a Pre-Incident Planning Program for the Elgin Fire Department

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CERTIFICATION STATEMENT

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

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ABSTRACT

Pre-fire planning plays an important role in helping provide information that can be utilized both during an incident and before the incident occurs. The problem is the Elgin Fire Department does not have a structured pre-fire planning program in place. This has resulted in not having critical information related to a building during incidents.

Using the descriptive research method as well as interviews and surveys, the goal was to determine what the objectives of a pre-fire planning program, what the recognized standards for a pre-fire planning program are, what building or occupancy features should be gathered to make the program successful, and how are pre-fire plans utilized during incidents. The research included interviews and a questionnaire to help determine objectives, standards, and what information should be collected to make the plan successful.

Results showed that NFPA 1620 *Standard for Pre-Incident Planning* (2010) was determined to be the national standard for pre-fire planning. A survey of area fire departments as well as the officers within the department helped to understand what other departments are doing, as well as the EFD officer's understanding and perspective regarding a pre-incident planning program.

The overall recommendation is to establish a formal pre-plan program for the Elgin Fire Department. This will require the development of a committee of various members of the department establishing the framework, as well as policies and procedures for implementation, utilization, and on-going updates for the program to be successful.

TABLE OF CONTENTS

ABSTRACT..... 3

INTRODUCTION 5

LITERATURE REVIEW 9

PROCEDURES..... 17

LIMITATIONS..... 20

RESULTS 21

DISCUSSION..... 31

RECOMMENDATIONS 33

REFERENCES 36

APPENDIX A..... 40

APPENDIX B 43

APPENDIX C 46

INTRODUCTION

“The fire service must realize that design professionals and the construction industry are not going to change the way they build structures. Instead, the fire service must change. We must inspect and preplan for fires in all buildings in our community (Dunn, 2007, p. 13).” Pre-plans used to be commonly found inside of 3-ring binders on fire apparatus. These binders typically contained a hand-drawn diagram of the building, a moment-in-time snapshot. When occupancies changed, or there were physical changes to the structure, the pre-plan would usually have to be re-drawn to depict the change. As meaningful as the idea was to put the pre-plans in the cab of fire apparatus, they usually didn’t get looked at, because of all the other activities the officer had to accomplish, prior to arrival at the incident scene. This, in essence, became the death of the pre-plan program to the Elgin Fire Department.

As technology changed and mobile computers were added to the apparatus, software was purchased that linked the incident location to a mapping program. If the developer had submitted a pre-plan drawing, it was added to the mapping software, but that was the extent of the pre-plan program. If responses were to locations without a pre-plan, responders had no information.

The problem is the Elgin Fire Department does not have a structured pre-fire planning program in place. The purpose of this research paper is to identify a pre-fire planning program to implement. The primary method of research for this applied research project is descriptive, but also includes interviews and surveys. The research questions are: What are the objectives of a pre-fire planning program? What are the recognized standards for a pre-fire planning program? What building or occupancy features should be gathered to make a pre-fire plan successful? How are pre-fire plans utilized during incidents?

BACKGROUND AND SIGNIFICANCE

Elgin, Illinois is located approximately 40 miles northwest of Chicago, along the banks of the Fox River. The city was incorporated in 1854, and the fire department's incorporation followed shortly thereafter in 1867. The current population is 108,188, making it the 8th largest city in Illinois (U.S. Census Bureau, 2010). The city covers approximately 35.2 square miles, and the land use consists of: 43% undeveloped, 30% residential, 10% parks/open space, 9% industrial, 5% public/institutional, and 3% commercial (R. Sessions, personal communication, January 15, 2013).

The Elgin Fire Department is a career department with 130 sworn members and 3 civilians. Elgin is an all-hazards fire department that provides responses for: fire suppression, EMS with ALS transport, hazardous materials, water rescue, technical rescue, and fire investigation. In addition, fire prevention, public education, and apparatus fleet services are also carried out by department personnel. The current Insurance Services Office, Inc. (ISO) rating for the department is 3. In 2011, the department responded to 11,286 incidents. This number has been consistently at or above this number of incident response for the last 5 years (Elgin Fire Department, 2011).

There are approximately 3000 buildings that are inspected annually. This is divided between 2 civilian fire inspectors, who focus on target hazards and company inspections that are completed by the on-duty fire companies. The current fire company inspection consists of validating key holder information, as well as basic building information. The information is then entered into the Records System for retrieval from within the fire stations or Communications Center. Any drawings that may exist for the building are not reviewed with the tenant(s) to validate information.

Elgin truly spans the gamut when it comes to occupancies, there are 2 hospitals, 3 high schools, an FAA facility that handles all aircraft traffic into and out of O'Hare International Airport, and an assortment of factories and smaller occupancies. There are also several dozen SARA Title III / Tier II businesses located within the city.

Pre-fire plans started in the early 1970's with the best of intentions, to provide the Incident Commander with information that was related to the building and/or occupancy. At that time, only target hazard occupancies received a pre-plan. Elgin's definition of a target hazard was any occupancy that had the potential of a high life loss, or high dollar loss. In the early 1970's, this only accounted for a handful of buildings. Because of the small number of pre-plans to be drawn, a firefighter with a cartography background meticulously drew each pre-plan. As the city grew, the list of target hazards grew, and the list of edits to existing pre-plans. The work then focused on getting critical target hazards only, black and white photocopies were made for the engines and trucks. The photocopy immediately reduced the effectiveness of the pre-plan, because the colors were removed (G. Knust, personal communication, January, 2013). As the city continued to grow, the drawings diminished and were replaced by photocopies, if provided, by the builders for the new commercial occupancies being erected in town.

In the 1980's and 1990's, the pre-plan drawings were replaced with incident support sheets that were generated from our AS400 based records system and placed in the 3 ring binders on the apparatus. Because of the difficulty in utilizing them while responding to incidents, the engine & truck officers typically did not utilize the pre-plans or the incident support sheets. This placed the burden onto the Battalion Chief who would view them, time permitting, after arrival on scene. This took the Battalion Chief's focus away from the incident; strategy & radio

communications, and was a recipe for disaster. In the end, they were only utilized if absolutely needed and typically by another arriving staff member.

In the early 2000's, our Computer Aided Dispatch (CAD) vendor offered a mobile computer solution for the apparatus. This began the mobile computerization of the Elgin Fire Department. Shortly after receiving the computers, a mapping software solution was purchased for the mobile computers, Remote Access. Through an interface between the CAD vendor and Remote Access, we were automatically able to link the incident address from CAD and the address in Remote Access. This would provide directions for response and also provide building information, if any, that was entered for that location.

This applied research project is linked to Unit 2; Assessing Community Risk, of the National Fire Academy course titled "Leading Community Risk Reduction" (National Fire Academy, 2011). This unit discussed the importance of assessing risk within the community and developing risk reduction priorities, determining acceptable risk, and creating objectives to address, minimize, or eliminate the risk. This research project is also linked to Unit 4; Leading Organizational and Community change. This unit discusses the importance of organizational change, and that the change has to create values that drive the organization. Implementing a pre-fire planning program will be a change to the Elgin Fire Department and if implemented correctly, will have an impact on firefighter and public safety.

This applied research project attempts to meet the following United States Fire Administration's operational goals: "Reduce risk at the local level through prevention and mitigation," "Improve local planning and preparedness," "Improve the fire and emergency services' capability for response to and recovery from all hazards," and "Improve the fire and emergency services' professional status" (United States Fire Administration [USFA], 2010).

LITERATURE REVIEW

What are the objectives of a pre-fire planning program? The purpose of a pre-fire plan is to allow preparation and fire attack to be carried out in the most effective & efficient way possible. Key items that impact fire attack must be included. Pre-plans allow for the initiation of attack to occur in a quicker manner, because of the knowledge of the building (Carter & Rausch, 2007). The pre-fire plan should also be designed to identify significant issues within a building, and how to mitigate the significant issue, if involved in the incident. The pre-plan should also be broad in nature, as to not be detailed down to specific points. Should the incident not involve those specific points, the pre-plan will be of minimal use (Clark, 1991). The plan should be a partnership between the fire department and property management team, as both have a vested interest in keeping both workers and firefighters safe. Potential problems or issues must be identified prior so that a strategy can be developed to mitigate the problem, should it occur (Plaughter & Burns, 2008).

Another important objective of the pre-fire program is firefighter safety. By not having a pre-plan program in place, it's possible that it could lead to firefighter injuries or death. Pre-incident planning should be part of a fire department's risk assessment program (Coleman, 2011). There are numerous NIOSH firefighter fatality reports that specifically list the lack of a pre-incident plan as a contributing factor to the firefighter(s) death. In addition, it is not uncommon to see one of the top recommendations from NIOSH to develop a pre-incident planning program. On the website www.everyonegoeshome.org, they have a link to a Microsoft

Power Point presentation titled *Fire Service Pre-Incident Planning*. After discussing the points of a pre-fire plan, they cite 7 different instances of firefighter fatalities where the lack of a pre-incident planning program played a role in their death (Everyone Goes Home, n.d.).

In order to be effective in their use, pre-fire plans need to be migrated from 3-ring binders into computers. Newer computer aided dispatch (CAD) systems allow for pre-plans to be loaded and affiliated with specific addresses. When calls for service are dispatched to those locations, the pre-plan is automatically displayed for dispatchers. Taking the computers one step further, fire apparatus are now being outfitted with computers, which would give all the responding apparatus the ability to view the preplan (Dunn, 2007). Using only the touch of a button, responding crews have all the information they need at the tip of their fingers. This also proves to be invaluable when responders are unfamiliar with the location that they are responding to (Galvin, 2012). In addition, the electronic pre-plan files are easier to update and distribute to apparatus and station computers.

Pre-fire plans should also include an element that discusses tactics, strategy, and actions to take. “Since 2001, many jurisdictions and businesses have included potential terrorist activities in preincident planning (IAFC, 2009, p. 215).” A common thought is that a pre-fire plan can be completed at the same time as a fire or code enforcement inspection. However, these two actions should not be completed at the same time, because the line of thinking is completely different. During a fire inspection, the crew is looking for fire code violations, whereas during a pre-fire plan, the crew is looking for problems that could arise during an incident in the building (Goodson & Sneed, 2007, National Fire Protection Association [NFPA], 1993). The pre-fire plan walk through serves two purposes; information gathering as well as a training opportunity.

The ability to discuss tactics, strategy, and resources while observing the unique characteristics of the building and discussing “what if’s?”

The utilization of pre-planning extends into many different disciplines of our everyday life. Some examples include the education system, business community, and law enforcement community. One education based example is in Illinois, where a house bill was passed *Illinois School Safety Drill Act* (Illinois School Safety Drill Act, 2005). This act applies to all public and private schools in the State of Illinois and sets forth criteria for three different types of annual drills; evacuation, school bus, and law enforcement. The act also stipulates annual review of the school’s emergency and crisis plan with police and fire agencies (Illinois School Safety Drill Act, 2005). The objectives of this act are to prepare the school children for incidents that would take place while they are in class, or in transit on the bus. The plan also prepares the teachers for handling different situation. Having the involvement of law enforcement & fire service in the annual plan review confirms that all agencies are on the same page.

The use of Geographical Information Systems (GIS) can help alleviate the duplication of work. The biggest advantage is that all of your data; hydrants, centerlines, address points, parcels are in the same place as the pre-incident plan data. It can also serve as a suitable replacement for commercial software programs designed specifically for pre-incident planning (Rogers, 2010). GIS is a tool that can be utilized to help identify buildings that should require a pre-incident plan. In order to take advantage of all that GIS has to offer, the department can utilize this technology to track; community hazards, risk factors, community assets, and potential impact. Tracking risk can be based on an individual building, or an entire neighborhood, an example would be an entire neighborhood with lightweight constructed homes (Oliver, 2011). Risk factors can include abandon homes, high crime areas, or older construction homes.

Community assets include businesses with monetary value, major employer in the community, businesses with an impact on infrastructure on the community, and public buildings.

An example from the business community is Business Continuity and Resiliency Planning. Companies such as IBM are reinventing themselves to become a pre-incident planner for their customers. Much like the fire department, IBM recognizes the importance of becoming proactive in helping plan for an unplanned man-made or natural disaster. If a customer ends up being involved in this type of situation, they will be looking to IBM for assistance (IBM, 2012). The tenants of the program are parallel to those of the fire service pre-plan.

An example from law enforcement discipline is an active shooter pre-plan. Occurrences of active shooter scenarios are continuing to occur on a regular basis. As this threat was recognized and assessed by the law enforcement community, the development of a pre-incident plan for an active shooter was developed (Department of Homeland Security [DHS], 2008). The guideline offers to individuals tips on how to recognize this type of individuals, but also how to respond to this situation.

The City of Chicago's Office of Emergency Management publicizes and hosts a website called Alert Chicago. The purpose of this website is to help Chicagoans prepare for natural or man-made disasters. The website offers insights on dealing with different scenarios, and teaching viewers to be prepared by being ready, responding, and recovering (Alert Chicago, n.d.).

What are the recognized standards for a pre-fire planning program? In 1987 in the state of Ohio, there was a large fire loss fire in a warehouse. As a direct result of that fire, several fire service leaders and insurance companies gathered to discuss preventing such an incident in the future. As a result of that meeting, NFPA 1420 *Recommended Practice for Pre-Incident*

Planning for Warehouse Occupancies was developed in 1993. “Pre-incident planning assumes an incident will occur. It makes no special effort to prevent a fire or eliminate a hazard, but rather to prepare for an incident, regardless of likelihood” (NFPA, 1993, p. 1420-4).

After NFPA 1420 was published and being utilized, the NFPA Standards Council was then consulted about expanding the NFPA 1410 standard to include other types of buildings, not just sprinklered warehouses. In 1998, the standard was renumbered to 1610 and the title was changed to *Recommended Practice for Pre-Incident Planning* (National Fire Protection Association [NFPA], 2010). Each fire department should be committed to create or improve their pre-plan program. Target hazards should be identified, prioritized, and a systematic approach to conducting pre-fire inspections must be completed. Pre-plans assist in life safety as well as property conservation (National Institute of Occupational Safety and Health [NIOSH], 2012).

The standardization of symbols assists when working in a Unified Command Post or working with mutual aid agencies. The symbols are simple in a way that they can either be drawn legibly by hand, or through the use of a computer program (National Fire Protection Association [NFPA], 2009). Consideration must be given to any pre-plans that were completed prior to the standard being instituted, as symbols may be different than the NFPA symbols.

NFPA’s standard for Fire Officer I and Fire Officer II specify that the candidate must identify not only features of a building, but also alarm monitoring equipment, conditions that can increase smoke and fire travel, forms and policies related to pre-incident planning. The candidate must also complete a pre-incident survey in a number of selective occupancies (National Fire Protection Association [NFPA], 2009).

The 2010 edition of NFPA 1610 was revised to become a standard and include minimum requirements to develop a pre-incident plan. The standard goes on to break down the pre-incident plan process by discussing a six-step process when conducting a pre-fire plan:

1. Evaluate physical elements and site considerations
2. Evaluate occupant considerations
3. Evaluate fire protection systems and water supply
4. Evaluate special hazards.
5. Evaluate emergency operation considerations.
6. Evaluate special or unusual characteristics of common occupancy.

(National Fire Protection Association [NFPA], 2010, p. 1620-25).

The Center for Public Education (CPSE) self-assessment manual addresses the importance of pre-incident planning in Category II: Assessment and Planning. The performance indicators include:

2A.7 The water supply system that provides available fire flow for the planning zones, major risks, key risks, and special hazard areas should be documented and included in the planning effort

2B.7 Fire protection suppression and detection systems are identified and being considered in the planning process (Center for Public Safety Excellence [CPSE], 2009).

What building or occupancy features should be gathered to make a pre-fire plan successful? During an emergency, time is of the utmost value, if pre-plans are complex, outdated, or otherwise ineffective, the potential loss of life or damage to property increases. Having a manageable, standard, set of data points on the pre-plan will assist responders with critical information. Features such as building construction and use, occupancy use, contents and

condition of the building are the minimum that should be documented (IAFC, 2009; Plaughter & Burns, 2008). Others believe the list should include:

1. All hazards present
2. Access points
3. Ventilation points
4. Built-in protection
5. Water supply
6. Structural weakness
7. Structural strong points
8. Ideal rate-of-flow formula
9. Provisions for additional alarms
10. Cooperation with other agencies

(Clark, 1991, p. 286). The information contained is a fine line, as too much information will make the plan unwieldy and potentially confusing for the user to utilize. The information contained in the pre-plan should contain items that aren't likely to change (Carter & Rausch, 2007). The pre-plan, when possible, should include an aerial photo as it allows the view to see the buildings location in relation to other buildings, hydrants, hazards and other features (IAFC, 2009). Murphy believes that your first priority is life safety concerns for both the occupants and firefighters. The building data should first be broken down by exterior features and interior features. A 360° reconnaissance of a building can return a significant amount of information and is the perfect place to begin the building diagram (Murphy, 2011).

When possible, the pre-plan should be further broken up to include a stand-alone sections on fire protection systems, HVAC, hazmat, and a vertical schematic showing stairs, elevators,

standpipes, as well as HVAC zones and occupant information (Murphy, 2010). The use of 3-D and 4-D modeling, when possible can further enhance the firefighters knowledge of a building. “Having digital building data and intelligence at firefighters’ fingertips will essentially impact the last tactical mile of situational awareness” (Murphy, 2010).

An Emergency Response Plan is designed for businesses to plan and prepare for emergencies and how to be protected. Pre-incident planning for the business community also indicates which features should be documented in the event of an emergency involving the business community. The items on a pre-incident plan for a business include; food and water, first aid supplies, fire extinguisher, tools, and protective equipment (Federal Emergency Management Agency [FEMA], 2012).

Pre-incident planning information is not only of value to the fire department for fire-related incidents, but also to the EMS crews within the fire department. A pre-plan could help identify what buildings may have impedances getting the stretcher to an upper floor via the elevator, or a potentially good location to land a helicopter for transport of a patient. Pre-incident planning has also become of significant value to the police department. Their most common use for a building pre-plan would be for an active shooter or a hostage situation. It is no longer only school buildings where this concern exists (Jakubowski, 2011).

How are pre-fire plans utilized during incidents? The pre-plan should be presented or displayed in a way to be easily viewed and understood during the incident. Utilization of electronic format, over a paper format, allows the form to be easily updated and displayed in vehicles or apparatus with mobile computer terminals (IAFC, 2009). Pre-plans need to be readily available, not only in command vehicles, but on first due apparatus. Consideration should be given to having a back-up hard copy at each fire station (Smoke, 2010). The pre-

incident plan needs to be the backbone of the operations during the incident. If completed properly, the plan should provide insight into developing strategy and tactics to mitigate the incident. Having this information readily available for the first-arriving apparatus and incident commander will prove to be invaluable (NFPA, 1993).

The pre-plans can be utilized to access fire suppression equipment, access, hazards or any special circumstances, or any other pertinent information. If available, consultation with on-site personnel should be established to determine if any changes to the occupancy or building have occurred since the last pre-plan update. This information could cause a change in strategy & tactics. Consideration should also be given to providing the dispatch center with access to pre-plans. The dispatchers can provide information to responding apparatus with information regarding the occupancy or building (Murphy, 2011).

The pre-incident plans should be in such a format that they should be able to be brought up on the computer screen and apparatus for viewing. This information should give the fire alarm companies a pre-designated place to stage, based on the pre-plan (J. P. Fahy, personal communication, January, 2013). Tactical considerations can be generated, based on the pre-plan on where to place firefighters or resources. Signs of a potential building collapse can be gathered from the building materials. Pre-determined collapse zone can be noted in the pre-plan for use (Brannigan, 1992).

If the fire department wants to increase the usage of aerial photos, consideration to the utilization of oblique images should be a consideration. Program such as Pictometry allows the user to all sides of the building (J. Bush, personal communication, January 18, 2013).

PROCEDURES

This Applied Research Project (ARP) utilized the Descriptive Research Method to research and locate the factors that are needed to implement a pre-incident planning program. In order to obtain the knowledge needed there was a review of numerous different sources. These different types of sources needed to be read, evaluated, organized, and finally analyzed to obtain a solution. Lastly, a series of personal interviews were done with City of Elgin staff members related to pre-incident planning. The goal of these personal interviews was to determine their opinions on a pre-incident planning program and the success of a pre-incident planning program.

The process of gathering research material began at the National Fire Academy in the Learning Resource Center located in Emmitsburg, Maryland in March 2012. While there a review of previous Applied Research Projects on pre-incident planning program was conducted along with journal articles and magazines that characterized a wide range of concepts on this topic. The research conducted was accomplished through a review of books, journals, and websites.

There are multiple standards that are present to address pre-incident planning. The most obvious standard is NFPA 1620 (*Standard for Pre-Incident Planning*) which was enacted in December 2009. This standard addressed all types of occupancies and provides direction on the process, information to gather, as well as usage and maintenance of a pre-incident program (NFPA, 2010). NFPA 1620 was not the NFPA's first attempt at a pre-incident planning standard, the first was NFPA 1420 (*Pre-Incident Planning for Warehouse Occupancies*). This standard was developed in August 1993, as the result of multiple high dollar loss fires in warehouse occupancies (NFPA, 1993).

Other NFPA standards are in place to address pre-incident planning, but they are contained within standards related to broader scope items. Examples include NFPA 1021

(*Standard for Fire Officer Professional Qualifications*) and NFPA 170 (*Standards for Fire Safety and Emergency Symbols*). The Center for Public Safety Excellence also offers suggestions for agencies seeking accreditation or the development of a Standard of Response Cover.

The information that was gathered during the research process was used to develop a questionnaire (Appendix A) that was distributed to 20 area fire departments. It was sent out on January 15th, 2013 and had a cover letter that explained the ARP. This questionnaire was conducted on SurveyMonkey.com and provided the respondent complete privacy when answering all questions. All respondents were asked to complete the survey by February 1st. The survey consisted of ten questions and was used to gain useful insight of what other fire departments utilized in their pre-incident survey program, if they even had a program. The content of the questionnaire focused on the following areas: a) If the respondents had a pre-incident planning program. b) Each respondent was asked to identify a list of occupancies they collect data on. c) Each respondent was asked to identify their department's proficiency using pre-incident plans.

The overall design of this questionnaire provided the author with a baseline of what other fire departments utilized for their pre-incident planning program. Providing each respondent with the ability to answer questions without consequence could provide valuable information for the fire district in the future if they decide to input a risk reduction plan.

The next questionnaire (Appendix B) was used to determine the feelings and knowledge of the officer corps of the Elgin Fire Department regarding the pre-incident planning program. This questionnaire was distributed to 39 officers of the Elgin Fire Department. All recipients were informed of the confidentiality of the survey and encouraged to complete in a timely manner. It was sent out on January 15th, 2013 and had a cover letter that explained the ARP.

This questionnaire was conducted on SurveyMonkey.com and provided the respondent complete privacy when answering all questions. All line officers were asked to complete the survey by February 1st. The questionnaire focused on the following topics a) The value that each officer placed on a pre-plan program. b) Each officer was asked to identify a list of their top five hazards that would need to be addressed with a pre-plan. c) Each officer was asked to give their overall opinion on the likelihood of using a pre-plan.

A series of personnel interviews were also conducted with subjects that are well versed in pre-planning and supporting data systems. As in person interviews was conducted with Joe Bush who is the Computer Aided Dispatch (CAD) and Geographical Information Systems (GIS) system administrator for the City of Elgin. Joe Bush has been involved in CAD and GIS since its inception in the City. The ability to leverage high resolution aerial imagery against a pre-incident planning program would give the fire department the equivalent of an extra set of eyes at the command post (J. Bush, personal communication, January 18, 2013).

LIMITATIONS

The amount of material that is available on pre-incident planning programs is very extensive. In addition to the fire service, virtually every aspect of life has some type of information on pre-incident planning. It seems that a lot of the non-fire service information has been driven by natural and man-made disasters.

While society believes that e-mail is considered to be the one of the easiest methods of communicating with multiple people in a relative short amount of time, it was actually a limiting factor in this research paper. Examples include following up with survey recipients, both internal and external, to confirm the survey would be completed on time. The deadline was

imposed in the interest of completing the paper, but also turned out to be a limiting factor for some individuals. Of the 20 fire departments that were surveyed only 16 responded. This equated to an 80 percent response rate. The same factors that hindered the responses from the department officers, but the involvement was slightly better at 90 percent. Not having all the responses available has the ability to really change the findings in one particular direction or another.

Lastly, there was no way to be assured that responses that were given to the surveys were accurate and without bias. A disinterest in the subject matter coupled with personal subjectivity could have ultimately influenced the responses.

RESULTS

This research was conducted through a comprehensive review of literature, and two different surveys (Appendix A) and (Appendix B) that embodies two different workgroups; outside fire departments and the Elgin Fire Department officer corps.

As several incidents occurred where the use of a pre-incident plan would have been helpful, the staff members began to look into what pre-plans were in place, why the program was no longer functional and how to create a program that would be beneficial and continue to be utilized.

The first two questions that were posed dealt with whether the department had an existing pre-plan program and, if so, the current preparation to utilize the program.

Table 1

Fire Department Survey Questions

	Does your fire department currently have a pre-plan program
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Yes	15 responses (95%)
No	1 response (5%)

	How prepared is your department currently to access and utilize pre-plans?
Well prepared	6 responses (38%)
Prepared	8 responses (50%)
Not prepared	2 responses (12%)

	What is main objective of your pre-plan program? (Check all that apply)
Provide information for incidents	16 responses (100%)
Provide information for inspections	0 responses (0%)
Provide information for other city departments	6 responses (38%)

The information from Table 1 shows an overwhelming majority, 95 percent, of the departments that responded have a pre-incident planning program in place. However, only 38 percent feel they are well prepared to access and utilize their pre-plan. 50 percent of departments feel they are prepared, bringing the total to 88 percent that is at least prepared to utilize their pre-plans.

The final question shows that the objective of the pre-incident planning program for all the responding departments was to provide information for incidents. In addition, some departments also shared their pre-plan data with other city departments. Life safety of firefighters, civilians and property conservation are the biggest factors that drive its usage (Brannigan, 1992 and Jakubowski, 2011).

Table 2

	What type of occupancies do you collect pre-plan information on?
Assembly	16 responses (100%)
Residential	2 responses (13%)
Business	13 responses (81%)
Mercantile	15 responses (94%)
Storage	5 responses (31%)
Other	9 responses (56%)

	Do you categorize your buildings into Target Hazards
Yes	13 responses (81%)
No	3 responses (19%)

	What data elements are collected
Gas shut-off	15 responses (94%)
Electric shut-off	15 responses (94%)
Lock box	13 responses (81%)
Fire Flow Information	6 responses (38%)
Fire Department Connection	12 responses (75%)
Other	8 responses (50%)

The information from Table 2 shows information is related to the building information within the pre-plan program. This information shows the type of buildings the fire departments

feel it's important to collection information on, as well as the most common types of information that are gathered. This is very basic information that can be helpful to initial arriving apparatus.

Table 3

	Who creates your current pre-fire plans?
Fire Prevention Bureau	9 responses (56%)
Operations	0 responses (0%)
Company Officers	4 responses (25%)
Chief Officers	1 response (7%)
3 rd party vendor	2 responses (13%)

	How often are pre-fire plans updated?
Annually	3 responses (19%)
2 years	4 responses (25%)
3 years	4 responses (25%)
4 years	0 responses (0%)
Other	5 responses (31%)

The information gathered in Table 3 relates to the pre-incident plan creation and update. This is critical as to the success of the program, because if the information is not up-to-date, it can be of little use (NFPA, 2010). The fire departments varied in who created the pre-plan with the majority of work completed by the fire prevention bureau. The duration between updates of the pre-plan can be misleading because there are many occupancies that simply do not change. Even though that may be the case, a walk through should be completed on a regular basis to confirm the plan is still current (Everyone Goes Home, n.d.).

Table 4

	Are pre-plans accessible from your apparatus?
Yes	12 responses (75 %)
No	4 responses (25%)

	If plans are available in apparatus, do pre-plans automatically display, based on address from CAD?
Yes	8 responses (50%)
No	8 responses (50%)

The information gathered in Table 4 is information that is going to become more common as technology changes within the fire service (Galvin, 2012).

The second survey (Appendix B) that was distributed was given to the sworn officers of the fire department. The first four questions that were posed dealt with the officer's opinion of a pre-plan program and the perceived value of such a program.

Table 5

EFD Officer Survey Questions

	Please indicate how important you think a pre-incident planning program is?
Very important	30 responses (86%)
Somewhat important	5 responses (14%)
Not important	0 responses (0%)

	Thinking about the last 5 years are there any incidents that you could have used a pre-fire plan?
Yes	35 responses (100%)
No	0 responses (0%)

	How would you currently rate the significance of a pre-fire plan while working on a large incident?
No value	0 responses (0%)
Some value	10 responses (29%)
Extremely valuable	25 responses (71%)

	Please indicate how likely it would be for you to use a pre-plan on an incident?
Very likely	24 responses (69%)
Somewhat likely	10 responses (29%)
Not likely	1 response (3%)

A review of the answers to Table 5 questions reveal that the officer corps of the department not only believe that there is a benefit to having a pre-incident planning program. There is also a strong belief that the pre-plans could have been utilized on previous incidents and would be utilized on future incidents, if the program is in place. Pre-plans allow for the initiation of attack to occur in a quicker manner, because of the knowledge of the building (Carter & Rausch, 2007).

Table 6

	List your top five (5) target hazards
Hospitals	
Nursing Homes	
Schools	
Universities	
FAA Facility	

	List your top five (5) least likely target hazards
Fire Stations	
Train Depot	
Public Works Storage Facility	
Strip malls	
Single-family homes	

A review of the responses in Table 6 shows what the officer's value as a target hazard. The majority of those choices involve highly populated areas, with potential mobility issues. The creation of the pre-plan for each of these facilities may also result in a heavier apparatus response, due to the critical tasks that may need to be completed, based on the results of the pre-plan. The other choice shows a critical infrastructure facility to the city, which offers security challenges due to the nature of their business (Brannigan, 1992).

Table 6

	What type of information should be identified and collected for the pre-plans?
Gas shut-off	30 responses (86%)
Electric shut-off	28 responses (80%)
Knox box	25 responses (71%)
Roof type	8 responses (23%)
Hazardous Materials	8 responses (23%)
Fire Protection Systems	7 responses (20%)

The responses in Table 6 reveal the values of what the officers believe are important elements to be contained within a pre-plan. Some of these answers could be based on past practice of operating without a pre-plan. An interesting study would be to go back and pose the same question to the officers, after a successful pre-incident planning program is operational and being utilized. After being shown all the information that is typically contained within a pre-plan, would they feel the same?

Table 7

	Should the department make a pre-incident planning program a top priority?
Yes	25 responses (71%)
No	10 responses (29%)

	Would you be interested in taking the lead in developing pre-incident plans?
Yes	15 responses (43%)

No	20 responses (57%)
----	--------------------

	Would you be interested in participating in a pre-fire planning program?
Yes	25 responses (71%)
No	10 responses (29%)

The responses to Table 7 show that the officer's support the creation of a formalized pre-incident planning program. While there is interest in participation, there is some reluctance to taking a lead in the program. There are a variety of factors that could impact this answer; morale, other assignments, perceived difficulty, a well-developed program with clear expectations, objectives, and clearly defined roles and responsibilities may decrease the fear or unwillingness of taking a lead role in the program (J. P. Fahy, personal communication, January, 2013).

Table 7

Pre-Plan Standards

NFPA 170	Standard for Fire Safety and Emergency Symbols
NFPA 1021	Standard for Fire Officer Professional Qualifications
NFPA 1420	Pre-Incident Planning for Warehouse Occupancies
NFPA 1620	Standard for Pre-Incident Planning
Center for Public Safety Excellence	Fire and Emergency Service Self-Assessment Manual

The standards listed in Table 7 are the predominantly the standards that are found for pre-incident planning. They provide an excellent framework to establish and maintain a pre-incident

planning program. The impact of the NFPA's standards give credence to the importance of pre-incident planning, as they extend into other standards and have a way of tying things together. For example, 1021 speaks on how pre-incident planning is part of the professional qualification for an officer.

Timeline

- By May 1, 2013 establish a pre-plan committee that is a cross-section of the department; fire prevention bureau, operations to determine occupancies which will be the priority
- By June 15, 2013 EFD administration, City of Elgin IT staff, and CAD system administrators to discuss technological aspects of the project
- By July 1, 2013 establish work groups to begin capturing pre-plan information.
- By July 15, 2013 begin to integrate existing pre-plan images into mapping system and/or CAD system
- By January 1, 2014 establish an internal city committee consisting of; fire, police, code enforcement with the intention of sharing pre-plan information. Code enforcement and police will have the ability to identify additional buildings that would be of concern to all departments.

DISCUSSION

The main goal behind this applied research paper was to identify a pre-fire planning program to implement. In addition, insight was gained which reinforced the importance of the Elgin Fire Department having a pre-incident planning program in place. The data collected coincides with the literature review. Analysis of data showed that the use of pre-incident planning could contribute to life safety; firefighter and civilian, as well as property conservation.

Additional analysis of the data collected showed that line officers and firefighters of the Elgin Fire Department agree that it should be a top priority to implement a pre-incident planning program. The data collected also showed that many personnel within the Elgin Fire Department are not interested in taking the lead in pre-incident planning, but felt it was vital to have a program in place. Finding a way to engage the personnel in this program will help ensure that the program is a success (J. P. Fahy, personal communication, January, 2013). Further evaluation of the reasons for not taking the lead will need to be obtained if a change in behavior is to occur. Reasons could include a lack of definition of what is involved with taking the lead, what each individual's roles will be, clearly defined expectations, objectives, and levels of responsibility are necessary.

The use of Geographical Information Systems (GIS) has rapidly evolved to become commonplace in the fire service. The ability to overlay a pre-plan drawing with an aerial image and make it available to the apparatus & incident commander has proven invaluable, as information is power. GIS can help the department identify and prioritize which buildings should receive a pre-plan, based on outside influences on the building, which can be seen with the aerial image (Oliver, 2011). In order for aerial imagery to be useful, it needs to be updated on a regular basis as well as flown at such a level that the photo can be zoomed in enough to not become grainy (J. Bush, personal communication, January 18, 2013).

The time and effort that is needed to implement a pre-incident planning program already has a basic framework in place to potentially draw from. This existing data will help to establish the program and make it operational. There will be a need to identify policies and procedures, as well as a system in place that reviews, evaluates, and recommends corrections to the pre-plans on

a regular basis. Perhaps an initial indicator for review is when a building owner submits plans for remodeling or renovations to the code enforcement department.

Data collected showed what the officers felt were the priority buildings to establish pre-incident planning records for. Their recommendations should be shared with the Fire Marshal to determine if these are also the bureau's priority or not. Data also collected showed that some line officers were interested in being involved in the development of a pre-incident planning program. Perhaps these individuals could be coupled with members of the fire prevention bureau and the Fire Marshal. Collectively, they could work to develop the program. There are many tasks to be completed, a lengthy process involving hours of research, consulting, writing, reviewing, and rewriting. The Fire Marshal could be the final authority for approval and implementation of the program.

RECOMMENDATIONS

Research shows that in order for a pre-planning program to be successful, there will be a significant amount of work to be accomplished. The days of passing the information on at the station, or working from memory must become something from the past. Firefighters must enter the 21st century and begin utilizing new tools that have become commonplace in the fire service (Jakubowski, 2011). A committee will need to be formed, most likely consisting of GIS technician, CAD system administrator, fire prevention bureau personnel, Operations Chief, Battalion Chief, and line personnel; Lieutenants and Captains. The first step will be to determine what information the crews would like to see while responding to incidents as well as information the fire prevention bureau would like. The information will need to be usable and placed in either the on-board mapping system or the Computer Aided Dispatch system. If the information is saved within the CAD system, then all pre-incident planning information would

also be readily available for the police to utilize during their incidents that require this information (Jakubowski, 2011). The determination will be based on which system will offer the most functionality and easy to use for responding personnel. Integration of existing GIS should be considered as well as maintaining up-to-date aerial images (Oliver, 2011).

Determining which buildings will be pre-planned will be the next step to determine. The easiest buildings to address are the ones that are already on file. They can be assigned to committee personnel to validate their content and then be forwarded for inclusion. The surveys showed which occupancy types the officers felt were most important to have a pre-incident plan for. This list should be shared with the group in an effort to determine an official priority listing for pre-plans to be completed. Discussion should then revolve around how often the records should be updated. Some type of record keeping system needs to be established that makes the date of pre-plan creation easily visible or query able. This can then be monitored to trigger updates to the program (NFPA, 2010).

A follow up survey needs to be completed involving the line officers as it relates to their reluctance to participate in a lead role in the program. There are many talented officers who would benefit the program by being involved. The goal of the survey should be to determine what the issues are and work to remedy them, if possible.

Initial implementation of the program should be small and measured, in the form of a pilot program involving fire prevention bureau personnel and line officers who have indicated they want to be involved. A complete roll-out of the program simultaneously to all officers on all shifts would likely lead to program failure. There will be questions regarding the forms and questions on how to obtain data that will need to be addressed. As questions are answered and the workflow is validated, a department-wide training program shall occur to all department

members. The training should include not only the survey process, but also rationale for program implementation, data collection, and data retrieval (Coleman, 2011).

In conclusion, there is a large amount of information available regarding the need to have a pre-incident planning program. In order to have a successful assessment there is a need to have motivated individuals involved from the ground level that have the authority and responsibility needed to successfully implement the program. Not having these factors in place will provide the opportunity for failure to occur.

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APPENDIX A

January 15th 2013

I have been given the honor of participating in the Executive Fire Officer Program with the National Fire Academy. As part of my curriculum, I am writing an Applied Research Project on pre-fire planning. I am surveying area fire departments to get insight on your organizations beliefs on a pre-fire plan program and an idea of the elements to are collected.

The information provided through the questionnaires will be presented in a research paper and submitted to the National Fire Academy. Your responses to this survey will be confidential; no individual will be identified with his or her responses.

Your response is very important to the success of this evaluation. Your opinion on pre-incident planning is vital to the success of this paper, and can be beneficial to the fire service as a whole. Completing the questionnaire should require no more than 20 minutes. The survey will save all responses and auto-record all answers for me. If anyone has any questions please send me an email at schmidt_d@cityofelgin.org.

Thank you for your participation and insight.

Assistant Chief Dave Schmidt

Elgin Fire Department

Outside Fire Department Survey Questions

1. Does your fire department currently have a pre-plan program
 - a. Yes
 - b. No

2. How prepared is your department currently to access and utilize pre-plans?
 - a. Well prepared
 - b. Prepared
 - c. Not prepared

3. What is main objective of your pre-plan program? (Check all that apply)
 - a. Provide information for incidents
 - b. Provide information for inspections
 - c. Provide information for other city departments

4. What type of occupancies do you collect pre-plan information on? (Check all that apply)
 - a. Assembly
 - b. Residential
 - c. Business
 - d. Mercantile
 - e. Storage
 - f. Other

5. Do you categorize your buildings into Target Hazards
 - a. Yes
 - b. No

6. What data elements are collected (Check all that apply)
 - a. Gas shut-off
 - b. Electric shut-off
 - c. Lock box
 - d. Fire Flow Information
 - e. FDC
 - f. Other

7. Who creates your current pre-fire plans (Check all that apply)
 - a. Fire Prevention Bureau
 - b. Operations
 - c. Company Officers
 - d. Chief Officers
 - e. 3rd party vendor

8. How often are pre-fire plans updated
 - a. Annually
 - b. 2 years
 - c. 3 years
 - d. 4 years
 - e. Other

9. Are pre-plans accessible from your apparatus
 - a. Yes
 - b. No

10. If plans are available in apparatus, do pre-plans automatically display, based on address from CAD
 - a. Yes
 - b. No

APPENDIX B

February 1st 2013

As many of you are aware I have been given the honor of participating in the Executive Fire Officer Program with the National Fire Academy. As part of my curriculum, I am writing a Applied Research Project on a pre-incident planning program. I am surveying all officers of the department to get insight on your beliefs on having a pre-incident planning program and it's worth.

The information provided through the questionnaires will be presented in a research paper and submitted to the National Fire Academy. Your responses to this survey will be confidential; no individual will be identified with his or her responses.

Your response is very important to the success of this evaluation. Your opinion on community risk assessment is vital to the success of this paper, and can be beneficial to the fire service as a whole. Completing the questionnaire should require no more than 20 minutes. The survey will save all responses and auto-record all answers for me. If anyone has any questions please send me an email at schmidt_d@cityofelgin.org or contact me at Station 1.

Thank you for your participation and insight.

Assistant Chief Dave Schmidt

Elgin Fire Department

EFD Officer Survey Questions

1. Please indicate how important you think a pre-incident planning program is?
 - a. Very important
 - b. Somewhat important
 - c. Not important

2. Thinking about the last 5 years are there any incidents that you could have used a pre-fire plan?
 - a. Yes
 - b. No

3. How would you currently rate the significance of a pre-fire plan while working on a large incident?
 - a. No value
 - b. Some value
 - c. Extremely valuable

4. Please indicate how likely it would be for you to use a pre-plan on an incident?
 - a. Very likely
 - b. Somewhat likely
 - c. Not likely

5. List your top five (5) target hazards
 - Hospitals
 - Nursing Homes
 - Schools
 - Universities
 - FAA Facility

6. List your top five (5) least likely target hazards
 - Fire Stations
 - Train Depot
 - Public Works Storage Facility
 - Bus Station
 - Single-family homes

7. What type of information should be identified and collected for the pre-plans? Please select your top three.
 - a. Gas shut-off
 - b. Electric shut-off
 - c. Knox box
 - d. Roof type
 - e. Hazardous Materials
 - f. Fire Protection Systems

8. Should the department make a pre-incident planning program a top priority?

- a. Yes
 - b. No
9. Would you be interested in taking the lead in developing pre-incident plans?
- a. Yes
 - b. No
10. Would you be interested in participating in a pre-fire planning program?
- a. Yes
 - b. No

APPENDIX C

**2013 RMS BUILDING INFORMATION
DATA ENTRY WORKSHEET**

Basic Data

Business Name: _____

Address: _____ Phone No.: _____ District: _____

Contacts

(Click new for each new Contact person
Business Name: (will carry over from Basic Data)

Priority 1. Name: _____ Phone No.: _____
(Can list pager or cellular numbers under other numbers)

Priority 2. Name: _____ Phone No.: _____
(Can list pager or cellular numbers under other numbers)

Building

Building Status: _____

1 Under Construction	6 Vacant & Unsecured
2 Occupied & Operating	7 Being Demolished
3 Idle, Not Routinely Used	0 Other
4 Under Major Renovation	U Undetermined
5 Vacant & Secured	

Construction Type: _____

1 Class I Fire Resistive	4 Class IV Heavy Timber
2 Class II Unprotected/Non-Combustible	7 Class V Wood Frame
3 Class III Ordinary	9 Not Classified

Roof Types: _____

1 Arched	4 Mansard	7 Steeple
2 Flat	5 Pitched	9 Unclassified
3 Gable	6 Shed	0 Unknown

Roof Materials: _____

1 Bow String Truss	6 Wood Parallel Chord Truss
2 Lightweight Wood Truss	7 Open Web Bar Truss
3 Engineered Wood Product	8 Multiple Types
4 Conventional Wood Rafter (Flat)	10 Concrete
5 Conventional Wood Rafter (Pitch)	11 Steel I beam
	12 Unknown

Y	N	
<input type="checkbox"/>	<input type="checkbox"/>	Roof Access _____
<input type="checkbox"/>	<input type="checkbox"/>	Above Grade _____

Y	N	
<input type="checkbox"/>	<input type="checkbox"/>	Below Grade _____
<input type="checkbox"/>	<input type="checkbox"/>	_____

More Building

See **Occupancy Use** Definitions in RMS Inspection Book

Occupancy Use: _____

Prevention Info
Systems Tab

Auto Extinguishing System: _____
Comments: Type in Location.

1	Wet Pipe	4	Foam	10	Partial Wet
2	Dry Pipe	5	Halogen	11	None
3	Other Sprinkler	6	CO2	20	Partial Dry
4	Dry Chemical	0	Special System	U	Undetermined

Detector Type: _____

1	Smoke	4	Sprinkler water flow	10	None
2	Heat	5	More than 1 type	11	None
3	Combination	0	Detector type other	U	Undetermined

Standpipe Info: **Other Systems Button (Click on New) Description:** Type in Standpipe
Comments: Type in Location.

Y	N	_____
<input type="checkbox"/>	<input type="checkbox"/>	Standpipe _____

Y	N	_____
<input type="checkbox"/>	<input type="checkbox"/>	_____

Prevention Info
Locations Tab

Locations (Click on New) Description: Type in choice **Comments:** Type in Location.

Y	N	_____
<input type="checkbox"/>	<input type="checkbox"/>	Gas _____

Y	N	_____
<input type="checkbox"/>	<input type="checkbox"/>	Electric _____

Prevention Info
Other Info Tab

Other Info (Click on New) Description: Type in choice **Comments:** Type in Location.

Y	N	Alarm Panel _____
<input type="checkbox"/>	<input type="checkbox"/>	Lockbox _____

Y	N	Alarm Panel _____
<input type="checkbox"/>	<input type="checkbox"/>	Other _____

Activities

New Action (Click on New) Action: Select **Business Inspection** or **Building Familiarization**,
Assigned To: Type in choice for Station/Shift, **Completion Date:** Select Date

Assigned To: _____ Completion Date: _____

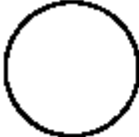
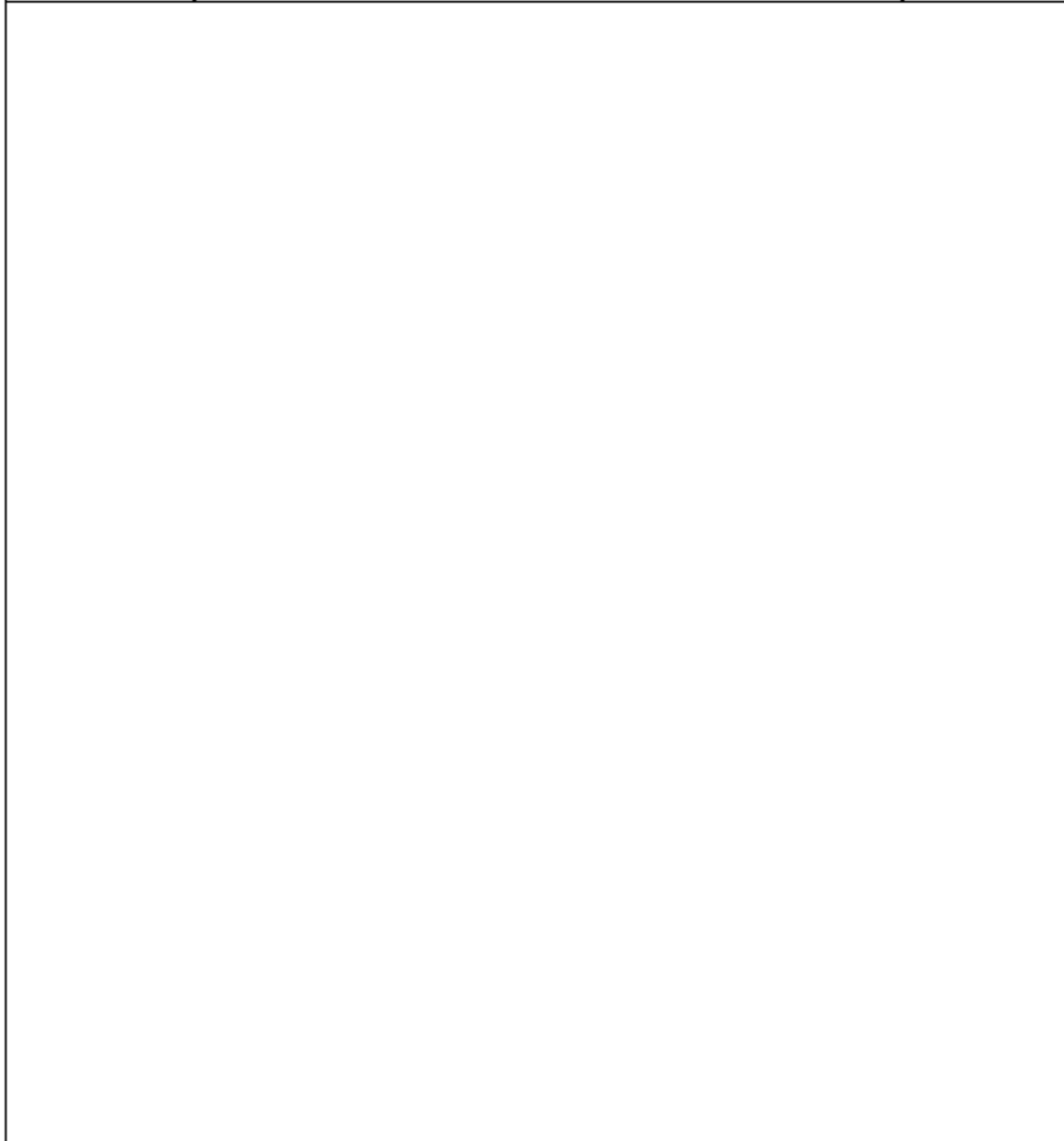
Y	N	Miscellaneous Information
<input type="checkbox"/>	<input type="checkbox"/>	Are you required to file Tier II reports?
<input type="checkbox"/>	<input type="checkbox"/>	Are there more than 1000 gallons or 1000 pounds of hazardous materials on site?
<input type="checkbox"/>	<input type="checkbox"/>	_____

Y	N	_____
<input type="checkbox"/>	<input type="checkbox"/>	Are MSDS available?
<input type="checkbox"/>	<input type="checkbox"/>	If yes, have they been filed for 2013?
<input type="checkbox"/>	<input type="checkbox"/>	Is an AED available on site?

Form Completed By: _____

Check when reviewed by Station Captain

PRE-INCIDENT PLAN DIAGRAM

<p>Direction</p> 	<p>Address:</p> <hr/> <p>Name of Occupancy:</p>	<p>PRE-PLAN #</p>
		

NOT TO SCALE