Putting CIKR Sites on the Map

Robert A. Spencer

Miamisburg Fire Department Miamisburg, Ohio

Certification Statement

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Abstract

The problem was the Miamisburg Fire Department map books did not designate any Critical Infrastructure and Key Resource (CIKR) sites. The purpose of this research was to develop a plan to ensure the Miamisburg Fire Department map books designate current CIKR sites. Action research was the methodology used to develop this plan. The research questions were (a) what CIKR site information needs to be included for the designated target hazards, (b) how would a company officer refer to the CIKR site information in the map book upon being dispatched, (c) how does a dispatcher notify the fire department that a particular response is to a CIKR site, (d) how do fire departments in other local jurisdictions identify CIKR sites, and (e) how will the CIKR site portion of the map book stay updated? Previous research and discussions with local dispatch centers and fire department shift commanders were used to obtain the information to complete this project. The results were very few entities have this information available even though the federal government says it is law. The recommendations were for all CIKR sites to perform a risk analysis and vulnerability assessment. Next the fire department was to collect the data, put it in the map book, have the dispatcher alert responders to look at that portion of the map book upon dispatching of alarms, and finally submit that information to the city's emergency manager to forward to the EOC materials for potential use. The fire department was also recommended to train representatives from each city department and eventually private sector representatives to affect a constant thorough flow of information to the emergency plan coordinator so the CIKR site data could then be properly distributed for use.

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Putting CIKR Sites on the Map

Introduction

All communities have the possibility of having a large scale emergency that could stretch beyond their capabilities and resources. Having a current assessment of the community's vulnerability, risk, and capabilities is a key element to an Emergency Operations Center (EOC) having the ability to provide proper resources to mitigate that incident in an efficient manner (Shouldis, 2010). Knowing this critical information and having it documented beforehand helps the emergency services prepare for and respond to disasters by allowing those managing the incident on scene as well as those managing resources from the EOC to work and plan from the same knowledge base (Beckmann & Simpson, 2006). A high level of preparedness will help to reduce the inevitable problems that can come with the initial response. The potential for problems starts with the gap in time between the impact of the event and the arrival of outside resources necessary to handle the incident properly (Perry & Lindell, 2007). A higher level of preparedness can also reduce the time of the recovery period.

Organizations that provide the vital goods and services within a community that are essential to the function of its society and economy are referred to as Critical Infrastructure and Key Resource (CIKR) sites. Because they are part of the lifeline to a community, it is usually more prudent to place a higher priority on them when experiencing a large disaster. The problem is the Miamisburg Fire Department (MFD) map books do not designate any CIKR sites. Not knowing special details about these unique sites could have an adverse affect on the outcome of the tactics of an unsuspecting on-scene commander, or the planning process of someone in an EOC during a large event. Having this special information could save the lives of firefighters,

building occupants, or citizens nearby the incident. It could also shorten the recovery phase in the aftermath of a large scale disaster.

Preparing such a plan is a lengthy and complicated process that involves a great number of people and organizations. Obtaining and maintaining accurate and current data is critical to the project and takes immense effort on an ongoing basis. The information needed comes from the private sector as well as the public sector. Some managers are reluctant to divulge information about their business because they feel it may show a weakness and cast a shadow on their performance. The opposite is true because their transparency towards achieving a higher level of preparedness actually shows their detailed analysis and concern for their responsibilities and their willingness to do something about it to protect the success of their organization (Cortez, 2010). Peltier (2009) noted that, often, some stakeholders need to be convinced of the value of assessing risk and advises to create a plan to get buy in from all involved including top management. Regarding the business world, a large loss translates into affecting cash flow. Considering the public sector, a large loss to its police, fire, or public works department could be devastating to the response phase as well as the recovery phase of an incident (Cortez, 2010). In either case, how well the emergency planning manager completes their risk assessment and emergency preparedness plan could determine how much federal funding may be received after a disaster (Beckmann & Simpson, 2006). Above all, the effectiveness of one's emergency preparedness and disaster plan is based on management's commitment to ensure it is reviewed and updated on a continual basis (Gustin, 2010).

The purpose of this research is to develop a plan to ensure the Miamisburg Fire Department map books designate current CIKR sites. The research questions are (a) what CIKR site information needs to be included for the designated target hazards, (b) how would a

company officer refer to the CIKR site information in the map book upon being dispatched, (c) how does a dispatcher notify the fire department that a particular response is to a CIKR site, (d) how do fire departments in other local jurisdictions identify CIKR sites, (e) how will the CIKR site portion of the map book stay updated? Having this information on the fireground and in the EOC could help reduce the severity of an incident. Action research was the methodology used for this applied research project.

Background and Significance

Miamisburg is a small city located in Montgomery County which is in southwest Ohio. The fire department is comprised of 30 career personnel who staff two fire stations. Miamisburg is eight square miles and boasts a population of 20,000. It is home to commercial establishments ranging from structures built in the late 1700's lining the downtown streets along a river bank to an international robotics plant built adjacent to a six lane interstate highway. Two railroad systems also pass through the city increasing the amount of various cargo vehicles transported through the city on a daily basis. The call volume averages 3,600 calls per year with 80% being requests for emergency medical services. Experience shows a history of calls that are not out of the ordinary with the exception of an historic train derailment in 1986 involving a white phosphorus fire and the evacuation of 40,000 people over a five day period. This lack of large emergencies equates to a low skill level of handling such events for those assigned to our EOC.

Operating within an EOC during a large scale disaster is challenging especially for anyone not accustomed to the demands one will encounter. An inordinate amount of information is received, prioritized, and passed on to the appropriate section for further processing and action. Many people need to think and respond as one to help guide the mitigation process to an organized and successful close. This same type process transcends into the recovery phase as

well. The Federal Emergency Management Administration (FEMA) has developed such a process and it can be used by local personnel who are familiar with the area or an outside Incident Management Team (IMT) can be brought in to assist with the procedure. In either case, following the process allows for a smoother more organized transition from one operating period to another. A vital part of this process is the developing of a CIKR map. A CIKR map provides a visual prop during an incident to help track the cascading events as they happen. This visual helps those in the EOC to prioritize the allocating of resources and predict the potential needs of future resources.

Currently, the city of Miamisburg does not have a CIKR map available for emergency responders or for use in an EOC. This can lead to a time delay in gathering valuable information for an arriving first responder. This lack of information for someone in an EOC could leave proper personnel allocation to chance instead of making a more informed decision. In either case, the decisions made could impact a large number of citizens. During the 1986 train derailment, the absence of a CIKR map had little effect because all of the emergency responders were long time residents of Miamisburg and they knew the city well enough to make informed strategic decisions. Today only six of those who would be involved in a large scale emergency are native to Miamisburg however, it is not likely they could retain and communicate all of the necessary information in as efficient manner as a CIKR map.

Maintaining an updated CIKR map in Miamisburg would be in line with the goal of the *Executive Analysis of Fire Service Operations in Emergency Management* class with respect to properly operating an EOC. This includes combining data collection, incident documentation, and executive level decision making under circumstances that change constantly without prior notice. Maintaining a CIKR map would allow our fire department to lead our community in an

all-inclusive, multi-hazard risk reduction plan which is the fourth objective of the United States Fire Administration (USFA) Operational Objectives (Appendix A).

Literature Review

The literature review included findings from previous research, as well discussions with the supervisors in charge of three local dispatch centers, two fire department accreditation coordinators, and four fire officers who serve as shift commanders for their respective departments.

Standard information for any CIKR site is the number of people occupying the property, any hazardous processes, and the main function of the building or organization. After that the data to collect can vary greatly. Macauley (2009) states that CIKR sites are any resources that provides essential fundamental function, goods, or services to a community's society or economy. The federal government has 18 sectors (Appendix B) in which to classify an organization or service as a CIKR site (FEMA, 2012). Regardless of the type of CIKR site it is, someone must complete an all hazards vulnerability assessment (Gustin, 2010) and take into consideration the possibility of the organization being a part of a cascading event to determine what information to report (Birkmann, 2006). The person responsible for the vulnerability assessment must determine and report their own priorities involved in their assessment to the proper authorities (Peltier, 2009). This will help emergency managers in prioritizing response, mitigation, and recovery planning process (Beckman & Simpson, 2006).

Information about how much CIKR site information to which the dispatchers were involved with comes from the jurisdiction involved. It is based on how much informational input the various organizations are willing to submit to be programmed into their specific address. These informational notes are known as premise hazards (M. T. Haines, personal

communication, May 24, 2012). Examples were cited of how information was collected for other types of official use and then retained for future use for all emergency services responders (R. F. Hensley, personal communication, June 15, 2012). One method of keeping the CIKR site information updated and current was revealed by a municipality pursuing the accreditation process for their fire department through the Commission on Fire Accreditation International (CFAI) (J. E. Neidhard, personal communication, June 27, 2012). The consensus of the shift commanders this author spoke with shows that they all rely on the familiarity of their own respective jurisdictions to identify CIKR sites while responding to emergency calls. None of these communities were over ten square miles and all had a population of less than 25,000.

The literature review exposed the necessity of a sense of urgency for developing and maintaining a comprehensive plan for CIKR site information mitigation purposes. It showed the magnitude of the amount of time and effort involved in collecting the necessary details and keeping them current for immediate use at a moment's notice. The literature review also created an awareness of what kind of long term impact this pre-incident knowledge, or a lack there of, would have on the recovery process after a large scale disaster. All of which helped the author to form a plan to encompass the continual commitment of teamwork from each of Miamisburg's divisions to develop and maintain a CIKR site assessment and vulnerability plan.

Procedures

Action methodologies were used to determine the answers to the research questions submitted for this applied research project. Previous research included business strategies towards emergency preparedness, and it was used to obtain a more global aspect of research by going beyond just investigating police and fire departments. Discussions with local fire departments within the same county were chosen to provide knowledge from the departments

with which Miamisburg was most likely to interact with during an actual large disaster. The intent was to potentially exchange information previous to any disaster incident in the process.

Previous research and discussions with local officials involved with CIKR site information for their respective communities were used to answer Research Question (1). One of the discussions was held with the Washington Township Fire Department in Centerville, Ohio. They are actively involved in the process of accreditation for their fire department. This process is through the Commission on Fire Accreditation International (CFAI) and they are beginning their fifth year of accreditation. The criterion for this endeavor demands the collection of a magnitude of community details, a good portion of which includes hazard assessment and community vulnerability. A separate discussion was held with the city of Moraine Fire Department. They use a form from the local county Emergency Management Agency (EMA) and have collected similar information on a limited number of structures within their city limits. The list of questions that guided these discussions can be found in Appendix C.

To answer Research Questions (2), (4), and (5), discussions with the MFD officer in charge of map books and three other fire departments that immediately surround Miamisburg were held at their respective headquarters. Questions found in Appendices C & D were used a guides for these discussions.

Collecting information to answer Research Question (3) was done by contacting three of the local police and fire departments dispatch centers located in within Montgomery County. This was done to help determine the process for which CIKR site information should be submitted to the dispatch centers in order to more efficiently disperse that knowledge to emergency responders when needed. Appendix E lists the questions used to steer these sessions.

Results

This applied research project was conducted to develop a plan to ensure that the MFD map books designate current CIKR sites and maintain updated information. The research, literature review, and meetings provided sufficient information to help guide MFD to that end.

Research question (1) – what CIKR site information needs to be included for the designated target hazards?

The answer to this research question is based on the specific individual site in question. There are different types of disasters and sometimes they cause different types of damage. The three basic categories for causes of disasters are human-engineered, technological, and natural. The human-engineered and technological most often involve terrorism or human error. Natural disasters are commonly weather related. Weighing the factors of risk, vulnerability, and probability are all part of the process of preparedness. Regardless of the disaster's source, it is likely to cause a secondary or even a tertiary compounding event complicating the emergency response as well as the recovery process. This is all the more reason to keep emergency preparedness and emergency response planning a high priority (Gustin, 2010). Since the late 1980's a worldwide pattern formed that large disasters became more expensive and more of a burden as time passed. It became apparent that only stressing the importance of response and recovery was becoming less effective. The thought process evolved into maintaining response and recovery as priorities and to put more significance on prevention and mitigation in disaster recovery planning (Beckmann & Simpson, 2006). From this evolution came an "all hazards" approach to planning for a large scale disaster. The value of this new concept was so immense the federal government passed the Disaster Mitigation Act of 2000 (DMA 2000).

DMA 2000 set a deadline of November 2004 which required all states and local jurisdictions to create and have in effect a Hazard Mitigation Plan for large scale emergencies. This plan had to be reviewed and approved by FEMA. Completion of this plan was critical because if these government entities did not meet the terms of this act they were not eligible for some of the available federal post disaster funds (Beckmann & Simpson, 2006). DMA 2000 focused on preparedness, response, and recovery planning. The preparedness portion of the plan emphasized saving lives and property through prevention strategies. The response factors dealt with ensuring adequate resources for emergency responders to enable them to save more lives and property. The recovery segment required the individual jurisdictions to develop actions that would bring that community back to normal conditions or at least to a minimal operating level after a large catastrophe. The overall plan had to include resource identification, a risk assessment, a mitigation plan, and explain how the plan was to be implemented and kept current (Gustin, 2010).

Such a plan centers on CIKR sites within a jurisdiction since they are the lifeline for that municipality to survive before, during, and after a major catastrophic event. CIKR sites are resources that provide fundamental function, goods, or services to a community that are essential to its society or economy (Macauley, 2009). One of the key steps in developing this plan is to perform a risk assessment for each of the identified critical infrastructures. This will identify what threats exist and which of these are the greatest threats to the jurisdiction. Plan managers can then prioritize the level of vulnerability of each threat and then develop actions to protect that infrastructure or accept that level of risk involved (Peltier, 2009). To help organize this process, FEMA breaks down all critical infrastructures into three types: contents, occupancy, and purpose. It also provides a myriad of federal agencies to assist the various critical infrastructure

organizations before, during, and after an event to reduce the losses that may be involved (Executive Analysis, 2012).

The literature review also revealed some potential oversights in decision making and planning process of identifying and protecting of CIKR sites. Macauley (2009) cautions that there are some CIKR sites are not designated as such just because they are not a direct component of the local community. These type organizations should be accounted for in some fashion because they are suppliers to designated CIKR sites who are a major part of the community. Examples of these may be information and data processing services or manufacturers of packaging used by designated CIKR sites to supply the necessary goods for response or recovery efforts. Another consideration is a cascading event. This is defined as one incident that triggers other incidents. One instance would be a hurricane that results in flooding where the high water overflows into a waste water treatment facility causing raw sewage to escape into a local river spreading disease and bacteria over a large area (Birkmann, 2006). Considering disaster possibilities and probabilities can add additional dimensions to a comprehensive risk analysis and vulnerability assessment.

The critical information derived from this process will be maintained for use in the city's EOC. Only the critical factors that the fire department can impact will be inserted in the CIKR site section of the map book for emergency responders to use in initial planning and response. This list would include resources needed for a response that involves just that particular property and a separate recommendation for resources involving an incident that would go beyond the borders of that property.

Research question (2) - how would a company officer refer to the CIKR site information in the map book upon being dispatched?

To answer this research question discussions were held with the Lieutenant in charge of MFD's map book (Appendix D) and three fire officers (Appendix C) from communities immediately surrounding Miamisburg. Two of the four departments contacted had that type of information in their respective map books. Their individual answers are listed below.

MFD – We don't have that information listed in our map books. We do have fire alarm panel locations, Supra box locations, and fire department connection information listed (W. R. Eaton, personal communication, August 10, 2012).

Moraine Fire Department (Moraine FD) – We don't have this information in our map books. We do have a list of buildings we consider critical infrastructure that could easily be distributed in a large incident. These are mainly buildings designated as mass care facilities, utilities, government buildings, and food and fuel outlets (G. D. Rettig, personal communication, May 31, 2012).

Washington Township Fire Department (WTFD) – That information is kept in a separate book for preplans. The CIKR sites in our map book have a note referring the user to the preplan book for CIKR information (J. E. Neidhard, personal communication, June 27, 2012).

West Carrollton Fire Department (WCFD) – We don't have that in our books. We only have hydrant locations and address numbers listed in our map books. Our shift commanders have a minimum of 15 years experience so we rely on past job knowledge since this is such a small town (C. C. Barnett, personal communication, May 27, 2012).

Research question (3) - how does a dispatcher notify the fire department that a particular response is to a CIKR site?

The dispatch centers for Montgomery County, Washington Township Fire Department, and the city of West Carrollton were interviewed to answer this research question because they

dispatch for the fire departments that are contiguous with MFD. The only similarity where dispatch would transmit special information to responding crews was if there was an incident where CIKR or other high priority information was entered into that particular address for that particular critical situation.

Montgomery County Regional Dispatch Center (MCRDC) – We dispatch it as a premise hazard which is programmed in when a municipality submits special information about a specific address. We do have some extra information collected on special properties that was required by the state or federal government. Regarding the fire department, it's mostly hydrant locations and flows, and on-site hazardous material information (M. T. Haines, personal communication, May 24, 2012).

Washington Township Fire Department Dispatch Center (WTFDDC) – We get our information through our fire department inspection, preplan, and plan review processes and any CIKR information we have is programmed into our computer and we on dispatch we tell the responder to check the preplan book for CIKR information (M. L. Long, personal communication, July 23, 2012).

West Carrollton Dispatch Center (WCDC) - We do not give that information out, we rely on the familiarity of the responders. The only exception to that is if we have a critical incident in progress and we have special knowledge about that address prior to the incident. For example, we have school layout information in case there is a hostage or shooting incident. We can transmit that information through our CAD system to the officers on scene however; we don't have that capability for the fire department (R. F. Hensley, personal communication, June 15, 2012).

Research question (4) - how do fire departments in other local jurisdictions identify CIKR sites?

One of the three departments interviewed had a process in place that could identify CIKR sites without the aid of dispatch or a special situation.

Moraine FD – We just rely on the responding officer's familiarity of the city or the critical infrastructure list used in special circumstances (G. D. Rettig, personal communication, May 31, 2012).

WTFD – We can look in our preplan book or our dispatcher will notify us to look in the preplan book for CIKR site details (J. E. Neidhard, personal communication, June 27, 2012).

WCFD – We only rely on the shift commander's knowledge of the city. Three of the four of us have been here over 25 years and the other has been here 15 years. We organize building tours every few years as training sessions so we stay pretty current with what is going on and our inspector keeps us abreast on any hazards on a regular basis (C. C. Barnett, personal communication, May 27, 2012).

Research question (5) - how will the CIKR site portion of the map book stay updated?

This question was posed to the same set of individuals to help determine the most efficient way they update and maintain information in order to help MFD determine the best method to keep CIKR site information current so the entire process can be effective.

MFD– The building and engineering departments and the Fire Marshal send me updates as they develop. I don't solicit them for the information. Anything they give me is put into the computer and then new map books are printed twice a year (W. R. Eaton, personal communication, August 10, 2012).

MCRDC – We don't request the information. The community sends it us at will and we maintain it as a premise hazard until they change it (M. T. Haines, personal communication, May 24, 2012).

Moraine FD – Our CIKR site information comes from the Montgomery County EMA. To get updates they would have go to the community and request those details annually. At present we just wait until the EMA sends us new information. (G. D. Rettig, personal communication, May 31, 2012).

WTFD - It is done only when awareness is drawn to it or a change is noted when a new preplan is performed (G. T. Achor, personal communication, June 27, 2012).

WCFD – We don't keep that type of information (C. C. Barnett, personal communication, May 27, 2012).

WCDC – We only do that when someone sends us an update. The schools usually send us something annually but I believe they are mandated to do that (R. F. Hensley, personal communication, June 15, 2012).

The previous research provided sufficient rationale for the why, how, what type, and how much CIKR site information should be collected. The information from the discussions with the local officials produced a wide range of responses. All of the departments relied on the experience of their shift commanders for basic knowledge of the CIKR sites to which they responded, however, it was quite apparent that the departments with the written information available to the these officers had a distinct advantage over those who did not when it comes to the unexpected. All of the research sources made it clear that keeping the data current meant taking an aggressive role in collecting it and keeping that information flow continuing to the proper destinations.

Based on these results the Critical Infrastructure and Key Resource Site Information Coordination Plan (Appendix F) was developed. It involves seven steps. The first five steps develop the program and get it into action in the first year. Steps six and seven pertain to continuing the program. It involves all of the city departments starting with the top administration and eventually includes the private sector creating a means of building a stronger bond between the two groups.

Discussion

Knowing what information to collect for a CIKR site incident would depend upon the function of that site and the source of the incident. Electric power plants, petroleum manufacturing facilities, hospitals, and large shopping malls may have some common hazards among them but they are obviously different in many ways. There cannot be a one size fits all data request list for all CIKR sites. In addition, creating one list for each type of disaster cause and effect for each CIKR site would be impossible let alone extremely time consuming. Having one plan from an "all hazards" approach is the most practical for each site. The source of any large scale disaster can be categorized as human-engineered, technological, or natural. Regardless of its source, it's likely to be part of a cascading event compounding the response and recovery process. Keeping emergency preparedness and emergency response planning a high priority can make a critical difference in the recovery process (Gustin, 2010). Over the past few decades more emphasis has been placed on prevention and mitigation in disaster recovery planning process. Looking ahead and putting more safeguards in place could ease and shorten the response and recovery portions of a large scale disaster (Beckmann & Simpson, 2006).

Seeing how essential the prevention and mitigation portion of disaster preparedness was to the nation's financial and emotional health, the federal government passed DMA 2000 to

ensure all municipalities had a proper mitigation plan in place. Knowing the value of this was so important, they made it law that those municipalities who did not meet the terms of this act were not eligible for some of the available federal post disaster funds (Beckmann & Simpson, 2006). DMA 2000 not only focused on preparedness, response, and recovery planning, it also required implementation and maintenance procedures. The emergency preparedness plan had to include resource identification, a risk assessment, a mitigation plan, and explain how the plan was to be managed and kept up to date (Gustin, 2010). To help implement this process, FEMA provides guidance through various federal agencies to assist with the planning for before, during, and after an event (Executive Analysis, 2012).

CIKR sites are the lifeline for that municipality since are the resources that provide fundamental function, goods, or services to a community that are essential to its society or economy (Macauley, 2009). It is not uncommon for some organizations to be overlooked as CIKR sites. An example would be suppliers of the known CIKR sites. Even though these organizations are not a direct link to the local economy their absence would still have a detrimental affect (Macauley (2009). One of the key steps in developing this plan is for each of the critical infrastructure organizations to perform a risk assessment. They can then identify what threats exist. Their plan managers can then prioritize the level of vulnerability of each threat and then devise a plan to protect against harm or accept that level of risk (Peltier, 2009). All of this information should be submitted to the local emergency manager so a community-wide plan can be devised and implemented.

After completing the interview process for this applied research project, the author noted that only one in four municipalities involved in the process seem to have a comprehensive collection of data available about CIKR sites. This is mainly due to the fire department

accreditation process it was currently pursuing (N J. Fogel, personal communication, June 27, 2012). One had a CIKR site list that included utilities, public safety stations, local government buildings, schools, and potential mass care facilities based on the power company's electric restoration priority list (G. D. Rettig, personal communication, May 31, 2012). Another had a small list from local organizations which were mandated to report this type of information (R. F. Hensley, personal communication, June 15, 2012). During all of the discussions, everyone agreed the emergency preparedness planning process was an invaluable tool and it would be advantageous for all municipalities to have one in place. Lacking resources to complete one was the main deterrent. For these organizations, it appeared that if there were no driving force or direct mandate involved then potentially valuable information would not be known until some point during a disaster.

At the conclusion of this research it appeared that, in general, there is a communication gap between the private sector and the public sector in regards to CIKR site information. It stands to reason that if a private organization goes through the rigorous procedures and spends the resources to complete a plan that they would make sure that plan got communicated to the proper authorities so it could be executed in time of need. This would help ensure their survivability after an incident. It also stands to reason that without this information the public sector cannot profess to have a completed plan. This means that the municipality without the complete plan runs the risk of bankruptcy if they don't obtain all the available federal funds after a catastrophe. With the potential future of each of these sectors so dependent on the other, a convenient cost effective method to close the gap needs to be in place for any organization in that situation.

Determining how a company officer would refer to CIKR site information in a map book when being dispatched resulted in three of the four departments relying on that shift commander's familiarity of that particular location (Appendix E). Taking into consideration that these communities are small gives some merit to that response as long as one of those officers is responding to the call. Here in Montgomery County, map books are exchanged amongst the various departments which commonly give or receive mutual aid with each other. Nonetheless, a mutual aid officer responding first due to an incident has no previous recollection on which to rely and upon which to make split-second life or death decisions.

Two of the three dispatch centers make emergency responders aware they are being sent to a CIKR site on a routine basis (Appendix C). The information is programmed into the computer as a premise hazard and it appears on the dispatch screen automatically for those specific addresses. The third dispatch center will notify responders of special hazards for an address if it involves that particular call. Otherwise, they rely on the shift commander's familiarity of the property. This proves to be a disadvantage for the first due officer in the absence of the regular shift commander. All of the local jurisdictions interviewed identify CIKR sites through information submitted to them by the public sector. The amount of information collected was driven by the individual collection process used by each entity (Appendix C). How and why the CIKR site information is transmitted varies for all three and was discussed in the review of the previous question. The downfall in all three systems is the lack of an annual process to gather the CIKR site information and then submit it to the dispatch centers so they can convey the alerts to the emergency responders.

The method used to keep CIKR site information current was consistent across the board once the initial information was received. All jurisdictions relied on the initiative of sources

outside of the fire department to provide updates and changes (Appendices C & E). Since this information is used by fire departments, police, and potentially in an EOC, it stands to reason that the municipality's emergency planning manager would make this process a priority throughout the organization so proper planning and documentation could be performed. This may take extra effort in the beginning however, most information doesn't change much from year to year so the residual updates would take far less time (R. F. Hensley, personal communication, June 15, 2012).

Current and accurate CIKR site information is critical to the entire disaster preparedness process. It is needed to guide the planning of the prevention, mitigation, response, and recovery phases of a proper plan. Though this applied research project only focuses on the CIKR site information for map books it is important to note that this information is used on all levels of a large scale incident. That includes emergency managers from the individual CIKR sites before a catastrophe to the federal IMT's brought into the EOC's who assist with the response and recovery phases after the incident. Not having this information makes everyone's job more difficult.

Recommendations

The purpose of this research project was to develop a plan to ensure the MFD map books designate current CIKR sites. Through the literature review, the rationale for the importance of collecting and retaining this information for the disaster mitigation, response, and recovery process were revealed through previous research. During interview sessions with dispatch center supervisors and shift commanders for several local fire departments, the various levels of CIKR site information and the individual collection methods were noted. The amount of complexity and time consumption involved in the compilation of this data was clear throughout both

methods used. After consideration of all of the research and findings, four recommendations were developed to keep CIKR site information current and available for emergency responders and for EOC use.

The first recommendation is to communicate the need and sense of urgency to have CIKR site information readily available to emergency responders and for EOC use in case of a large disaster. This needs to start with the appointment of a project coordinator. One person is needed to champion the plan and be responsible for its progress (Gustin, 2010). This person needs to be very familiar with the process and be committed to the process because there is a great deal of information to project to the individuals who actually collect the data, notwithstanding the site information that needs to be collected and then processed. This person also has to be able to meet with the municipality leadership to get buy in and the approval to expend the enormous amount of resources involved in executing this plan.

The second recommendation is to involve and train someone from each of the departments within the city to help collect information and coordinate the disaster preparedness plan and risk assessment for their respective departments. This is especially true for all of the fire department since they are the ones interfacing with the private sector businesses and obtaining the needed information while performing preplans and fire and safety inspections.

The third recommendation is to organize the CIKR site information and make it accessible to those who may need it. Fire department personnel need it to handle emergency response effectively and efficiently. Department heads as a group need the data to help prioritize the levels of vulnerability so a general disaster plan can be created and followed if there is a catastrophe. In that regard, the recovery phase for city properties can go more efficiently and help shorten that time frame. Organized CIKR site information is essential for use in an EOC

whether it is populated by local supervisors or an outside IMT called in to assist in an overwhelming incident. This is especially true if an incident lasts through more than one operational period and the information needs to be transferred to the next person taking over.

The fourth recommendation is to keep the process current and fresh by rotating new department plan managers in to the program. By appointing two or three new people into the process each year, the program could take on a slightly new perspective plus broaden the employee knowledge base city wide. In addition, reach out to the private businesses in the community and involve them in the training cycle. This would help them understand what information is needed, how it is used, and how the entire disaster plan works. Then the business community could better prepare themselves to become a more valuable partner in the mitigation and recovery phases of the city's disaster plan.

The culmination of all the previous research and literature review produced the Critical Infrastructure and Key Resource Site Information Coordination Plan (Appendix F). Successful execution of this seven step plan will increase the awareness of CIKR sites in Miamisburg as well as their potential threats during a disaster. This higher level of preparedness can lessen the blow of a large scale event and increase our potential for obtaining all of the available federal funds if one occurs.

Successful implementation of this plan can be measured by evaluating three things. The first is the completion and maintenance of a CIKR site map including the list of sites with their respective pertinent details for the EOC. The second would be the exact same information put in a CIKR site section of the map book and kept current on a semi-annual basis. Lastly, the MCRDC continues to update the premise hazards as we submit the new data to them on a regular basis.

If someone were to replicate this study I would recommend one modification to the procedures that this author followed. That would be to allot more than six months to interview several private sector businesses to see how much urgency they place on preparedness and how much of their resources they actually use towards disaster planning. These would be random types of CIKR sites within the city limits to get a more thorough and varied view on the subject. Infrastructure organized on the national level should also be investigated. More specifically, I would contact the railroad systems, Ohio Department of Transportation, and a federally recognized IMT representative. This information would be transmitted to the city's emergency planning team to give them an improved outside perspective resulting in a more effective and efficient process.

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Appendix A

United States Fire Administration Operational Objectives

1. Reduce the loss of life from fire in the age group 14 years old and below.
2. Reduce the loss of life from fire in the age group 65 years old and above.
3. Reduce the loss of life from fire of firefighters.
4. To promote within communities a comprehensive, multi-hazard risk-reduction plan led by the fire service.
5. To respond in a timely manner to emerging issues.

Appendix B

FEMA Critical Infrastructure and Key Resource Sectors

- Agriculture and Food
- Banking and Finance
- Chemical
- Commercial Facilities
- Communications
- Critical Manufacturing
- Dams
- Defense Industrial Base
- Emergency Services
- Energy
- Government Facilities
- Information Technology
- National Monuments and Icons
- Nuclear Reactors, Materials, and Waste
- Postal and Shipping
- Public Health and Healthcare
- Transportation Systems
- Water

Appendix C

Emergency Responder CIKR Site Questions

1. Does your municipality have a list Critical Infrastructure and Key Resource (CIKR) sites for use in their EOC in a disaster/emergency?

   Moraine FD – Yes, we have an Excel spreadsheet of CIKR facilities with emergency contact information.

   WCFD – No, we don't keep that type of information.

   WTFD – Not as you described it however, we do have the capability to create a list of our own defined critical sites i.e. hospitals, nursing homes, and other specific sites that we could print off in an emergency.

2. Does your department have a CIKR site map for EOC use?

   Moraine FD – No, but one can be made quite easily on request.

   WCFD – No.

   WTFD – No, but we are in the process of making one. Presently one could be created with the list noted above and then note them somehow on the large local area map for EOC use.

3. How does your dispatch center obtain and maintain/manage CIKR site information?

   Moraine FD – Dispatch does not have this, the fire department does and is maintained and kept in the battalion and Chief's vehicles.

   WCFD – They store whatever information is given them and used only when it is pertinent to a particular call.

   WTFD – Through preplans and research obtained through our first accreditation process.

4. How does your dispatch center identify these sites and communicate that fact to emergency responders?

   Moraine FD – They do not do that.

   WCFD – They would only tell us in a high priority case. We rely on the shift commander's knowledge of the city. Three of the four of us have been here over 25 years and the other has been here 15 years. We organize building tours of high hazard sites every few years as training sessions so we stay pretty current with what is going on and our inspector keeps us abreast on any new hazards on a regular basis

   WTFD – They are programmed in a premise hazard or the computer indicates that it is in a specific demand zone the system alerts the dispatcher to inform the responders.

5. How did you go about creating this list of CIKR sites?

   Moraine FD – This list was created with assistance from the Montgomery County Emergency Management Association (EMA) from a list that I provided to them. It was developed for priority listing for the local electric company, Dayton Power & Light.

   WCFD – We don't have a list.

   WTFD – It was a requirement for our fire department accreditation process.

6. What Critical Infrastructure and Key Resource (CIKR) site information needs to be included for the designated target hazards in your jurisdiction?

   Moraine FD – Our list is based on the electric company's restoration priority list. It is mainly utility companies, public safety stations, local government buildings, schools, and potential mass care facilities within the city limits.

WCFD – If we had a list it would be based mostly on high life hazards and hazardous materials.

WTFD – We look at life safety in regards to vulnerability, hazardous materials and their potential impact, and financial impact on the local economy.

7. How would one of your company officers refer to the CIKR site information in the map book upon being dispatched?

   Moraine FD – We don't have this information in our map books.

   WCFD - We don't have that in our map books. Our books show hydrant locations and address numbers. Our shift commanders have a minimum of 15 years experience so we rely on past job knowledge since this is such a small town.

   WTFD – A notation is present which refers to the preplan book.

8. How does the CIKR site portion of the map book stay updated?

   Moraine FD – Nothing is in the map books. In a perfect world, the county EMA would request this information from the community on an annual basis.

   WCFD - We don't keep that type of information in our books.

   WTFD – It is done arbitrarily when awareness is drawn to it or a change is noted when a new preplan is performed.

9. If you don't have a CIKR site map section in your map book, how does your fire department identify CIKR sites in emergencies?

   Moraine FD – They would have to refer to the CIKR list that I provided from the Montgomery County Electrical Restoration Planning form.

   WCFD - Our shift commanders have a minimum of 15 years experience so we rely on their job knowledge.

WTFD – Our responders would draw on their previous knowledge of on scene information, preplan notations in the map book, and special hazard notations inputted in the dispatch center computer.

The following information is the name and title of the person interviewed along with the date and location.

Moraine FD

Lt. Gary D. Rettig

3333 Pinnacle Park, Moraine, OH 45429, May 31, 2012

WCFD

Capt. Chris C. Barnett

125 W. Central Ave, West Carrollton, OH 45449, May 27, 2012

WTFD

Deputy Chief Jim E. Neidhard, G. Thomas Achor, Special Projects Coordinator

Norman J. Fogel, Special Projects Coordinator

8320 McEwen Rd, Centerville, OH 45458, June 27, 2012

Appendix D

Discussion with MFD's Lieutenant in Charge of Map Books

1. How do you obtain information on Critical Infrastructure and Key Resource (CIKR) sites and how do you maintain that information long term?

   This information is relayed to us by the building and engineering departments. Copies of the water system and streets are kept at Station 53. Other info is maintained in our preplan books.

2. How do you obtain information on newly developed streets and how do you maintain that information long term?

   I usually check with the engineering department on a semiannual basis for new streets. The old secretary used to keep me updated. There have been no additions in a while. The information is placed in the map books on the computer so it will appear on the next update. This is also what I do with any discrepancies reported to me. They are fixed and will appear in the next printing.

3. How do you obtain information new fire service features like FDC's, fire alarm panel locations, Supra boxes etc..., and how do you maintain that information long term?

   This information is provided through the fire marshal from inspection and plans review and added to the Building Profile book. I also received updates when we did preplans. This info is again added to the computer copy to be printed on the next update.

4. Is there any other information that you put into MFD's map book and if so, how do you maintain it long term?

Currently, the map books have some hydrant location information and strange address information, like McGuire Street or the Mound address that is actually off of Range Avenue. It is maintained on the computer long term.

The following information is the name and title of the person interviewed along with the date and location.

MFD

Lt. W. Ray Eaton

10 N. First St. Miamisburg, OH 45342 July 8, 2012

Appendix E

Dispatch Center Critical Infrastructure and Key Resource Site Questions

1. Does your municipality have a list Critical Infrastructure and Key Resource (CIKR) sites for use in their EOC in a disaster/emergency?

   MCRDC – Yes and no. No we don't have a CIKR site map however; we do have a map with that type of information on several specific high priority sites.

   WCPD - No list, but we do have a specific preplans for special sites - Appleton Paper (chlorine tanks), Ahlstrom (chemicals), Crown Cork & Seal (chemicals), all schools (lock down situations).

   WTFDDC - Yes, all of our critical infrastructure sites are listed and on our map.

2. Does your Dispatch center have a CIKR site map for EOC use?

   MCRDC – No, but we can print off a map of those specific high priority sites which something similar yet it is limited to those sites only.

   WCPD - No.

   WTFDDC - Yes, all of our critical infrastructure sites are on our map. The map is divided into demand zones and each dictates an emergency response based on the hazards located at the site. .

3. How does your dispatch center obtain and maintain/manage CIKR site information?

   MCRDC - From the municipalities we serve. Occasionally a dispatcher retains the info from a specific incident and will input this extra information into our files. This information is entered into the computer as a premise hazard for that address.

   WCPD - Voluntary input from the community.

WTFDDC - All of the information comes from fire and safety inspections, annual preplans, or plan reviews on new structures.

4. How does your dispatch center identify these sites and communicate that fact to emergency responders?

   MCRDC - As a premise hazard in the CAD system. This input comes from the responding municipality or from dispatchers making notes from a high priority call.

   WCPD - We do not, we rely on the responders familiarity.

   WTFDDC - They are programmed in as a premise hazard or the computer indicates that it is in a specific demand zone and the system alerts the dispatcher to inform the responders.

5. How does the CIKR site portion of the map book stay updated?

   MCRDC – We have no map book but we keep our files as current as we can through premise hazard updates from the municipality or special situation calls from dispatchers.

   WCPD - We do not have a CIKR site section in our map books.

   WTFDDC - All the information from inspections, preplans, and plan reviews are automatically submitted and then twice a year we update our map books.

6. If you don't have a CIKR site map, how do your police/fire departments identify CIKR sites in emergencies?

   MCRDC – Through premise hazards that have been inputted to specific addresses which come from the municipalities – how much information received/given depends on the jurisdiction. CAD can hold virtually unlimited premise hazards per address with 200 characters per premise hazard. DP&L, the schools, and few others update their information fairly regularly. Most businesses do not. If a Taco Bell turns into a Mexican

restaurant, for example, we probably won't be told. Utilities like the national gas lines are mandated to inform us and they do. We have MAP STAR which shows the police department, fire department, and hydrants. Another program we have is MAVERICK which shows schools, churches and medical facilities. We use these two different systems concurrently. They are separate but work together quite well. One is detailed and cluttered while the other is not as specific but shows the surrounding environment very well. Depending on the type of details needed for the call, one is better than the other. Examples would be a showing the geographic lay out of the land for a suspect on the loose or a haz-mat incident. It could as simple as the next closest hydrant for a structure fire.

WCPD - We rely on the familiarity of the fire department responders. All but one of the captains has been here almost 30 years.

WTFDDC - We do have a map, however if another department responds mutual aid and is first due, dispatch will alert the shift commander and he will contact the incoming company of the hazards they need to know about.

The following information is the name and title of the person interviewed along with the date and location.

MCRDC

Sgt. Matt T. Haines

460 Vantage Point, Miamisburg, OH 45342, May 24, 2012

WCPD

Sgt. Rob F. Hensley

300 E. Central Ave., West Carrollton, OH 45449 June 15, 2012

WTFDDC

Deputy Chief Mike L. Long

8320 McEwen Rd, Centerville, OH 45458, July 23, 2012

Appendix F

Critical Infrastructure and Key Resource Site Map Book Coordination Plan

1. The Critical Infrastructure and Key Resource (CIKR) site coordinator will set up a meeting with the city manager and the Fire Chief, Miamisburg's emergency plan manager, to explain the process and get their feedback and commitment. This includes designating a representative from each department to lead the process in their respective area of responsibility. A timeline will be established for reporting progress and any deterrents.
2. The CIKR site coordinator will set up a training session for the department representatives so they will have a clear understanding of the process, what information is needed and the importance of the plan. Part of the training would be a short demonstration of a windshield survey and how that information is transmitted to the EOC and what the EOC does with that knowledge. Then individualize each department's role in the process to show how they fit in during a large scale event whether it is during the mitigation, response, and the recovery phases. Also, establish a rapport with each to ensure two way communications and get their personal buy in to help ensure the process is a success. A timetable will be established to set follow up meetings, goals, and a reasonable deadline for data collection.
3. A similar training session will be held by the CIKR site coordinator for the fire department to facilitate getting the information from the private sector CIKR sites. For the initial information gathering, the fire department will divide the city into six sections and assign one to each of the individual crews and performed during routine preplan assignments. (MFD has two stations and three 24 hour crews.)

4. On a monthly basis the information gathered will be submitted to the officer responsible for our map books so it can be put in the computer. For the first year the CIKR site listings will be printed quarterly to orient everyone to the new system and to work out any problems sooner to get the process up and running smoothly by the end of the year. Simultaneously this data will be given to MCRDC to enter as premise hazards so the dispatchers can alert the crews to check the map book for CIKR site information.
5. The CIKR site coordinator will obtain a large map of the city from the engineering department. After the information is put in the computer, the CIKR site locations will be designated on the map using the same symbols and the same detail listing method presented in the *Executive Analysis of Fire Service Operations in Emergency Management* class. The engineering department will shrink the map to 8.5" x 11" so we can place them in our map books. Quarterly, this large map will be reviewed with all members of the fire department. It will also be presented to the city staff during the quarterly staff meeting to familiarize the supervisors with the map, the symbols, and the plan because they will be the ones using it in the event the EOC is opened for an incident. This information will also be submitted to the city's emergency plan manager so the city's disaster plan can be updated.
6. Once the plan has been established, the CIKR site coordinator will hold orientations annually for any new program managers from the other city departments and open these meetings to the private sector. This will help close any communication gaps that might exist and we can receive feedback from outside of the fire service which may improve the program.

7. Beginning with the second year, inputting any new CIKR information into the computer will continue on an ongoing basis. The printing of any new CIKR information will switch to semi-annually to coincide with the current printing of new map book information.