HELPING THE COMMUNITY BECOME BETTER PREPARED TO DEAL WITH WIDE SPREAD POWER OUTAGES RESULTING FROM MAJOR CATASTROPHES

Executive Leadership

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Appendices Not Included. Please visit the Learning Resource Center on the Web at http://www.lrc.dhs.gov/ to learn how to obtain this report in its entirety through Interlibrary Loan.
Abstract

Hurricane Wilma directly impacted Broward County Florida and specifically the City of Hallandale Beach on Monday, October 24th, 2005. In addition to the expected problems associated with large scale emergency operations, the emergency operations center experienced a number of unanticipated issues related to recovery. Following the storm, there was a lack of normal communications, and extended electricity outages which created demands from the community which the City had not planned. The purpose of this research is to identify opportunities, and develop a procedure to enhance the emergency preparedness capabilities of the City of Hallandale Beach. This was predominately an action research project. The research questions were:

1. Are the residents of the City of Hallandale Beach prepared for Hurricanes, or any other large scale emergency which may affect the community, in particular the lack of electricity?

2. What shortcomings are evident for the community to be better prepared to respond to and recover from a similar event in the future?

3. What specific action can be taken to ensure any gap between identified shortcomings and the desired degree of preparedness are met?

Procedures included a literature review to establish community preparedness levels, and associated rules designed to assist city leaders in ensuring the community was readily prepared. A comparison of problems associated with Hurricane Wilma to those rules in place helped determine legislative gaps, and subsequently determine which actions needed to be taken to address these gaps.
The results were that Hallandale Beach was not, and could not be, sufficiently prepared to manage large scale power outages without making some legislative changes. Legislative remedies were evaluated and proposed as a means to ensure the residential community was capable of sustaining themselves for a reasonable period of time in the event of a total power outage.

The primary actions taken, based upon this research, was the adoption of several local ordinances designed to ensure the community is better prepared for large scale emergencies, in particular those issues related to wide spread power outages.
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Introduction

According to the National Hurricane Center, the 2005 hurricane season was one of the most active and deadliest in U.S. history. More than 1250 persons deceased in the Louisiana and Mississippi region as a result of Katrina made it the third deadliest hurricane in United States history (Deadliest Hurricanes, 2006). There were a record 26 named storms (storms with sustained winds of at least 39 miles per hour), 14 hurricanes, and three Category 5 Hurricanes (sustained winds exceeded 155 miles per hour) in the 2005. Records show, prior to the 2005 season Florida had been directly hit by more hurricanes than any state (Mainland Hurricane Strikes, 2006), with Southeastern Florida being affected by the highest number of major (categories 3-5, sustained winds exceeding 110 miles per hour) hurricanes.

Nearly two months into the recovery phase of Hurricane Katrina, Florida was directly hit by Hurricane Wilma. On October 24th 2005, Hurricane Wilma landed on the west coast of South Florida and exited on the east coast in Broward and Palm Beach counties. Forecasts up until just hours before the storm actually hit Broward County called for Wilma to be equivalent to a weak Category 1 hurricane when it reached the east coast, and it was not expected to hit Broward County directly. Subsequently, the evacuation plan executed by Broward County Emergency Management officials was limited to mobile home residents. The City of Hallandale Beach formally activated its Emergency Operations center at 12 p.m. October 23rd to coordinate emergency activities with the Broward County as outlined in state statute (SS Chapter 252).
The problem became apparent when the Broward County was unexpectedly
*directly* impacted by Hurricane Wilma as a Category 2 hurricane. In addition to the
significant degree of structural and tree damage, electrical outages affected more than
98% of all Florida Power and Light users for an extended period of time, some for more
than 20 days. Except for those evacuated from their mobile homes, most residents stayed
home during the storm. Essentially all of the residents of Hallandale Beach remained in
place and without electrical power for an extended period of time. The purpose of this
study is to identify opportunities to enhance the Emergency Management capabilities
within the City of Hallandale Beach, in particular to help the community better prepare to
care for themselves in the event of electrical failure for the first 48 to 72 hours. This is
predominately an action research project. The pertinent research questions are:

1. Are the residents of the City of Hallandale Beach prepared for Hurricanes,
or any other large scale emergency which may affect the community, in
particular the lack of electricity?
2. What shortcomings are evident for the community to be better prepared to
respond to and recover from a similar event in the future?
3. What specific action can be taken to ensure any gap between identified
shortcomings and the desired degree of preparedness are met?

The results of this research will help enhance the degree of community preparedness, and
allow the City of Hallandale Beach to more efficiently and effectively accomplish the
recovery requirements called for during similar events. Hallandale Beach residents will
be better prepared to care for themselves, thereby creating less of a burden on emergency
response personnel, which will create a safer and healthier environment for all community stakeholders.

Background and Significance

Hallandale Beach is an Oceanside community located in southeast Florida between the cities of Miami and Fort Lauderdale. The city is in the midst of a highly urbanized area, and is diverse in terms of occupancy types. Hallandale Beach is a 4.4 square mile city, which includes two major pari-mutuel facilities, more than 45 high rise buildings and has a permanent population of 47,000 with an average age exceeding 65 (Sternstein, 2003). Hallandale Beach is a full service community, which provides public safety to its citizens through its own Police, Fire and Public Works departments. The Fire Chief is responsible for coordinating emergency management for the City of Hallandale Beach. County level emergency management activities are coordinated through the Broward County Division of Emergency Management, which in turn coordinates directly with the State of Florida.

Hallandale Beach is in the incipient stage of a developmental boom. Residential projects affecting Hallandale Beach will increase the number of units from approximately 25,000 to more than 35,000 over the next four years. High rise development will account for more than 95% of this residential growth. Additional commercial investment of more than $3 billion is expected during this same time frame (Sternstein, 2003). Of even more concern are recent legislative changes which will allow for Las Vegas style slot machines to be installed within the Cities two pari-mutuel facilities. Each facility expects to have an average daily attendance exceeding 10,000 people during the week and 25,000 on
weekends. Clearly, the risk associated with emergency management will continue to increase and remain a major concern.

The questions posed suggest this research identify if the residents of Hallandale Beach are adequately prepared to deal with the effects of midsize to large events, similar to those experienced during the aftermath of Hurricane Wilma. Also, to identify gaps that can reasonably be addressed to be better prepared, and finally what specific steps can be taken to bridge any identified gaps. This Applied Research Project directly relates to the course “Executive Leadership,” particularly in terms of evaluating the author’s ability to influence positive change in community emergency preparedness.

This project is in line with the United States Fire Administration operational objective “to promote within communities a comprehensive, multi-hazard risk reduction plan led by the fire service organization” (NFA, 2002, p. II-2) by evaluating and enhancing the ability of the city to better prepare the community for large scale emergencies.

Literature Review

The purpose of this literature review is to establish the foundation for this action research. Three basic questions need to be addressed. First, was the community as prepared as can reasonably be expected to deal with the aftermath of Hurricane Wilma, in particular the effects of widespread power outages caused by the storm? Second, what apparent shortcomings were readily noticeable? Finally, what specific action can be taken to bridge some of the gaps which may have existed?

Six million Florida Power and Light customers were without power, some for more than 18 days across several southern Florida counties (Smith, 2006). Rebecca
Smiths analysis of the criticisms levied towards the utility company focuses on the lack of mitigation efforts taken after previous incidents. The Florida Public Service Commission charged that the utilities plans and infrastructure aren’t up to the challenge posed by the increased hurricane activity. According to State Attorney General Charlie Christ, the utility company should stop “building lines so they get knocked down again and again.” The Attorney general, who plans to run for governor, intends to seek legislation requiring power companies to bury critical supply lines in an effort to mitigate future problems.

Studies conducted by KEMA Inc., a Dutch consulting firm with a U.S. energy practice concluded Florida Power & Lights infrastructure had numerous failures (Dorschner, 2006). Of the 950 utility poles owned by Florida Power & Light that failed, 47 percent showed significant signs of deterioration. The study concluded distribution towers collapsed due to inferior installation techniques, high voltage transmission lines built to withstand 140 mile per hour winds and essentially all of the local distribution lines which are expected to withstand 60 mile per hour winds failed. In all, damages from the storm season are expected to cost Florida Power and Light more than $1.7 billion.

This author’s personal experience as the principal Incident Commander for Hallandale Beach during this emergency concludes the community was not prepared to deal with widespread power outages. Incident Command was formally activated on Sunday, October 24th 2006 at noon, however all preparation activities including staffing and development of an Incident Action Plan had been accomplished. City staff has significant experience dealing with hurricane emergencies utilizing an established
municipal emergency operations center. Notwithstanding this significant experience, and the fact we lie in the heart of hurricane alley, Wilma was the strongest hurricane to hit Broward County in 55 years (PBS&J, January 2006), and caught this county off guard.

The City of Hallandale Beach suffered a complete (100%) disruption of electrical power as a result of Hurricane Wilma. Post incident meetings were held among key city officials including but not limited to the City Manager, Mayor and City Commission, Police, Fire, and Public Works officials. The lack of power combined with not evacuating residents created significant problems which were unanticipated. Some of the issues of most concern to the senior city staff was the fact that residential buildings lacked backup energy systems, all intersections were without power, all lift stations were without power, and although fuel was in supply it was not recoverable. These issues will be reviewed further in the discussion section of this research.

A thorough review of the city of Hallandale Beach Code of Ordinance (City Code) revealed there were no local rules in place requiring elevator owners or service stations to maintain backup power in the event of a power outage. Also, this author carefully reviewed the language in the National Fire Protection Association’s Uniform Fire (NFPA 1) and Life Safety Codes (NFPA 101). The National Fire Protection Association (NFPA) is a nonprofit organization, which provides information on fire prevention, firefighting procedures, and methodology for dealing with fire protection and life safety. NFPA standards are not only the most commonly accepted standards within the fire industry; but in 2002 the state of Florida adopted NFPA 1 and 101 as state law.
For High Rise Buildings, standby power shall be connected to the fire alarm system, electric fire pump, central control station and lighting, not less than one elevator serving all floors, and mechanical ventilation equipment (NFPA 101 sec 11). NFPA 101 code language will require more than 30 high rise buildings constructed prior to Florida adopting this code in 2002 to retrofit emergency standby power systems, but they would not have to do so prior to 2014. Furthermore, this language would not affect the more than 200 additional buildings with elevators traveling one or more floors, but less than the 75 feet targeted by NFPA 101. None of the language provided in any of the aforementioned documents addressed the issue of fuel capacity to ensure backup power was maintained for a reasonable period of time, nor was there any language requiring a service station to have backup power to transfer fuel in the event of an emergency.

Clearly there existed a gap between the preparedness requirements the community was subject to, and those which would ensure the city was not overwhelmed in the event of a massive power outage. Reliance on Florida Power and Light to be able to correct their vulnerabilities anytime soon is unreasonable at best. Reasonable options to bridge this gap will have to be accomplished legislatively, procedurally, and with enhanced education to the community. The absolute demand by the City of Hallandale Beach elected officials, City Manager, and community to immediately address the impact of power outages prompted the actions later described in this research.

Procedures

*Definition of Terms*
High Rise Building – A building greater than 75 feet in height where the building height is measured from the lowest level of fire department vehicle access to the floor of the highest occupiable story.

Ordinance – An official, legislative action of the commission, which action is a regulation of a general and permanent nature and enforceable as a local law.

Catastrophic Disaster – A disaster that will require massive state and federal assistance, including immediate military involvement.

Major Disaster – A disaster that will likely exceed local capabilities and requires a broad range of state and federal assistance.

**Limitations and Assumptions**

The author does not claim any statistical analysis to be scientific. Any reference to the term statistics is understood to mean within the authors limited ability to analyze said information. This author assumes the reader is educated to the concepts and terminology provided in NIMS, Standard Emergency Management Concepts, and ICS in general. Although there were numerous issues related to the preparation, response, and recovery of this and the potential for future hurricanes and major disaster events, this research is limited to those issues specifically related to mitigating the negative impact of future power outages.

A literature review was conducted to establish the definitions and functions of local government and to attempt to determine the cause and reasonable limitations of the Power Company to anticipate and prepare for the effects of a catastrophic or major disaster. State and local ordinances and rules were evaluated to determine if there was effective legislation in place to minimize the impact to those agencies providing
emergency and public safety services. This author was interested specifically, in the scope and purpose of the local government in ensuring the community was prepared to care for itself for a reasonable period of time. Evaluations of technical reports and post incident reviews were conducted in an attempt to evaluate the causation of the power outages, with the intention of minimizing those causes most easily addressed.

The author, along with the City Manager, elected officials and other Command and General Staff members conducted interviews and town meetings with residents and business leaders throughout the community. These meetings were utilized to determine, from the perspective of the constituency, issues they felt needed to be addressed and improved upon. Staff also utilized these meetings to elicit from the community what their level of preparedness was, what services they received from the city, and what they felt should be reasonable expected from them in the event of a similar situation. Staff also utilized these meetings to evaluate the community’s ability to handle such an emergency, particularly in respect to evaluating if adequate backup power and planning was available to those particular constituents.

Brainstorming was conducted among the managerial staff of the City of Hallandale Beach, which included all Department Directors, all emergency services Command and General Staff participants, Elected City Officials, and any employee involved in this event wishing to provide input. Personnel were asked to submit through their respective departments a list of issues which created the most problem for the city, and to identify opportunities to correct those problems. The purpose of this brainstorming methodology was to determine the feasibility of addressing issues and to
prioritize how these actions were to take place, while allowing input from all those
affected by this disaster.

A master list was compiled, and a formal project was created and assigned to the
Fire Chief by the City Manager to ensure each item was addressed appropriately. Since
the priority issues were predominately related to the lack of power, and staff felt most of
the issues could be corrected with emergency backup power sources, research was
conducted by the City attorney to determine if legislation was enacted elsewhere to
require residents and select business to better prepare. Finally, in conjunction with the
Building Official and City Attorney, Local Ordinances were drafted for public hearings
and enacted as law by the Hallandale Beach City Commission effective January 17th,
2006. The action component of this research project is included as appendices.

Results

The results of the literature review, peer brainstorming activities, and community
meetings revealed numerous gaps in the cities emergency management program,
particularly related to preparing for massive electricity shortages. Electricity is the
backbone of essentially the entire infrastructure within the community, and there was a
widespread and long lasting lack of needed power. The cost to bury transmission lines
throughout the state would cost approximately $52 billion (Smith, 2006); as opposed to
the approximate $1.7 billion it cost the power company to recover from Wilma. Florida
Power and Light cannot reasonably be expected to completely mitigate a similar major
catastrophe, such as this hurricane, or any other disaster affecting the power
infrastructure. While we await voluntary efforts on the part of the power company, or
legislatively induced mitigation efforts on the part of the state legislators, this author and the City of Hallandale Beach felt it necessary to take local corrective action.

Brainstorming activities conducted among staff, personal experience dealing with the storm, and a review of the emergency operations logs highlighted problems related to the lack of power. Lack of emergency backup power in residential buildings, due to fuel shortages or a lack of generation equipment, eliminated the availability of elevators for use by residents and responders. With the exception of no more than six high rise occupancies, all residents were out of power at some point during this emergency, and none for less than 60 hours. Food and water availability became a widespread problem due to the lack of refrigeration and ice making capabilities, and local supermarkets did not open for more than 48. Residents lost the ability to operate home oxygen generators, ran out of insulin, and missed critical kidney dialysis appointments. As fuel continued to run dry in these buildings, Life Safety Systems throughout the city became critically inoperable.

Police officers worked 36 hour shifts to maintain traffic control at critical intersections, guard gasoline stations as power resumed and crowds became unruly, and to secure the federal point of distribution (POD), which was set up to distribute basic necessities. Curfews had to be established because of the fear of looting, and more importantly to prevent accidents throughout the city. Public Works employees worked around the clock rotating the two 65 kilowatt generators to each of the 25 lift stations to ensure wastewater did not back up into the streets. These same employees also shuttled gasoline in 55 gallon containers to our critical facilities and to those condominiums with backup generators to prevent further system insult.
Discussions with community leaders, particularly those from residential condominium associations revealed most had no backup power, and those that did ran out of fuel within the first 18 hours. These residents felt the city should have provided them with fuel and emergency generators to ensure their comfort and safety. Residents were concerned there was a lack of personnel available to deliver food and water to their apartments. In all cases there was consensus that preparation for power outages needed to be enhanced. Residents also expressed concern that information via television, the internet and phone service was severely lacking, all of which are directly related to electrical power.

Clearly there was enough evidence the lack of power was the primary contributor to the tremendous burden placed upon the city’s emergency operations, and the community in general. The main focus on addressing mitigation for future events such as this would have to concentrate on ensuring the power infrastructure was protected, or at least emergency backup power sources were greatly enhanced. Additionally, education would need to focus on ensuring the community was aware of their responsibilities, and with the exception of emergency needs could become self-reliant during the first 48 to 72 hours following a disaster of this type.

Finally, the action component of this research produced two ordinances specifically addressing the issues outlined within this report. Ordinance 2006-01, “AN ORDINANCE OF THE CITY OF HALLANDALE BEACH, FLORIDA, AMENDING…” (Appendix A) was created to require any residential occupancy with an elevator to install a generator and ensure an adequate fuel supply of 72 hours within three years. This same ordinance also requires these same occupancies to develop an
emergency plan for review each year by the Hallandale Beach fire Department, and that it is submitted prior to June 1, 2006. Ordinance 2006-02, “AN ORDINANCE OF THE CITY OF HALLANDALE BEACH, FLORIDA, MANDATING THAT GAS STATIONS…” requires all service stations in Hallandale Beach install emergency generators within three years.

Discussion

The author is aware the solution presented may not be popular, and in fact has heard from residents concerned with the financial impact these ordinances pose. However, it became increasingly apparent how vulnerable the community is to the effects of a complete power outage. It was also surprising to see how wide spread the damage to the power infrastructure was as a result of a hurricane, which was not considered to be major. The ideas that Florida Power and Light is responsible for enhancing the vulnerability of the power system is reasonable, however the unlikelihood of this happening will continue to loom on the minds of emergency managers should we face another direct hit in the future. The actions taken by the City of Hallandale Beach will ensure this community is better prepared to deal with a complete interruption of power, and will lessen the overall demand on emergency management personnel as they deal with the effects of large scale emergencies.

The impact to city employees was avoidable for a number of reasons. The lack of emergency backup power is clearly stated as the primary impact; however it became clear the community was not prepared to be self sufficient for the first hours after this emergency ensued. The emergency plan component of the generator ordinance will provide city staff the opportunity to ensure residents are educated on the importance of
stocking adequate water, appropriate foods and medicines, and have reasonable expectations of the city’s ability to provide non emergency assistance when burdened with a bona-fide emergency. Also the service station requirement will ensure fuel is available to transport needed equipment, ensure emergency vehicles have needed fuel, and most importantly to ensure emergency generators are kept operational.

Recommendations

As an action research project, recommendations are closely related to the results of this author’s research. Recommendations for developing local ordinances were a result of the research findings, in particular the requirement for residential buildings with elevators to provide generator backup power and to develop emergency operations plans reviewable by the fire department (Appendix A), and for local fuel service stations to install emergency generators (Appendix B). Clearly there is still room for Hallandale Beach to effectively manage the more complex emergencies, however, the adopted ordinances will provide an improved degree of community readiness in the event of an emergency similar to Hurricane Wilma. By ensuring the community can better provide for itself during the critical first few days without electricity, emergency workers can concentrate their efforts on traditional emergency response requirements and effectively restoring the community to normal.

Further participation in pursuing regional improvements to these issues will continue to be a priority for the City of Hallandale Beach. The Mayor, City Manager, Fire Chief, and Police Chief are all currently active on county wide committees which were created to continue to evaluate issues related to emergency preparedness. City staff has fully bought into the National Response Plan, and the city is in compliance with the
National Incident Management System compliance schedule. Additionally, this city has
taken a proactive approach to enhancing our established citizen corps program to ensure
community education related to emergency preparedness is enhanced.

This author feels the recommendations and actions brought forth in this document
can provide benefit to future readers, as it did for the City of Hallandale Beach.
Progressive Emergency Management leaders understand the value of proactive
management and leadership concepts. While legislative solutions may not always be
appropriate to resolving problems, this author has a newfound respect for the value of
utilizing the legislative process to ensure the public safety of our constituents.
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