REPORT OF THE
DEPARTMENT OF EMERGENCY SERVICES ON

State of Preparedness in Virginia for a Catastrophic Disaster

TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA

HOUSE DOCUMENT NO. 21

COMMONWEALTH OF VIRGINIA
RICHMOND
1994

PREFACE

House Joint Resolution 666 was requested by the House Committee on Rules. The resolution requested the Virginia Department of Emergency Services to report on the state of preparedness in Virginia for a catastrophic disaster.

Copies of the report were distributed to the following organizations for review and comment:

Executive Committee of the Virginia Emergency Management Association

State Emergency Medical Services Advisory Board

Virginia Hazardous Materials Response Specialists

Executive Committee of the Hampton Roads Emergency Management Committee

Virginia Emergency Responders Institute

Virginia Association of Counties

Virginia Municipal League

Virginia Association of Planning District Commissions

Transportation Safety Training Center

The Department wishes to express appreciation to the following organizations who provided invaluable information in support of this project:

Federal Emergency Management Agency

Florida Department of Community Affairs, Division of Emergency Management

North Carolina Department of Crime Control and Public Safety, Division of Emergency Management

Pennsylvania Emergency Management Agency

RESOLUTION

1993 SESSION

LD9376232

HOUSE JOINT RESOLUTION NO. 666
AMENDMENT IN THE NATURE OF A SUBSTITUTE
(Proposed by the House Committee on Rules
on February 6, 1993)
(Patron Prior to Substitute—Delegate Fisher)

Requesting the Department of Emergency Services to report on the state of emergency preparedness in Virginia for a catastrophic disaster.

WHEREAS, the Virginia Department of Emergency Services has for a number of years had an emergency response plan for natural disasters, which has been kept current and used over the years for floods as well as other disasters; and

WHEREAS, recent super hurricanes such as Hugo in 1989 and Andrew and Iniki in 1992 have made it clear that existing state emergency operations plans are not sufficient for response to catastrophic disasters or to deal with a massive federal response such as that which took place in South Florida following Hurricane Andrew; and

WHEREAS, recent tropical storm history and predictions for the future indicate a probable increase in the frequency of super hurricanes to which Virginia is vulnerable along its east coast; and

WHEREAS, these storms are of such magnitude and strength that they penetrate well inland affecting areas not normally at risk from the effects of coastal hurricanes; and

WHEREAS, the Department of Emergency Services has recognized the need for more extensive hurricane planning and has been working with various state agencies, local governments, the federal government and the volunteer community in the development of the Virginia Hurricane Emergency Response Plan which is scheduled for completion and testing in mid-1993; and

WHEREAS, the Department of Emergency Services is the lead agency for the development of an interstate mutual aid compact among the 19 states that compose the Southern Governor's Association (SGA), and the compact is scheduled for completion in the spring of 1993; and

WHEREAS, the U.S. Army Corps of Engineers is in the process of finalizing a detailed hurricane hazard and threat vulnerability analysis, known as the Virginia Hurricane Evacuation Study, for the Commonwealth's 18 coastal jurisdictions; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That the Department of Emergency Services be requested to report on the state of preparedness in Virginia for a catastrophic disaster.

The Department shall complete its work in time to submit its findings and recommendations for review to the House Committee on Conservation and Natural Resources and the Senate Committee on Agriculture, Conservation and Natural Resources by December 1, 1993. Upon the completion of the review, the Committees shall recommend such legislation and policy changes as may be necessary to ensure a maximum state of emergency preparedness in the Commonwealth. The Department shall submit its report to the Governor and the 1994 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for the processing of legislative documents.

STATE OF PREPAREDNESS IN VIRGINIA FOR A CATASTROPHIC DISASTER

TABLE OF CONTENTS

TABLES

APPENDICES

REPORT ON THE STATE OF PREPAREDNESS IN VIRGINIA FOR A CATASTROPHIC DISASTER

INTRODUCTION AND EXECUTIVE SUMMARY

NOVEMBER, 1993

INTRODUCTION

This study fulfills the request by the House Committee on Rules under House Joint Resolution 666, to the Virginia Department of Emergency Services to report on the state of emergency preparedness in Virginia for a **catastrophic** disaster.

The Commonwealth of Virginia and its political subdivisions are vulnerable to a variety of natural and technological hazards that occur at varying levels of intensity, magnitude, and duration, and which have the potential of imposing a wide range of personal danger, destruction, and suffering upon its citizens. The extent of human suffering, as well as physical and economic devastation, that will be brought about by a catastrophic disaster is unlike that ever experienced in Virginia in recent history. **The level of devastation in a catastrophic disaster demands an extraordinary degree of coordination and integration of local, state, federal, and private sector resources, both human and material, to immediately assess the needs of the disaster area, and effectively mobilize and deploy the appropriate assets to respond to those needs.** An effective, coordinated response will create a solid foundation for short- and long-term recovery socially, economically, as well as in regard to the infrastructure of the impacted area.

In Virginia, hurricanes are perceived to be the most likely hazard that will precipitate a disaster of catastrophic proportions. According to meteorological experts, Atlantic hurricanes are expected to increase in frequency and intensity during this decade. This vulnerability is exacerbated by the level of population growth and economic development that has occurred in the Commonwealth over the years, coupled with an emergency services infrastructure at all levels of government that is struggling to keep pace with the daily challenges, not to mention preparation for a catastrophic event.

SUMMARY

Hurricane Andrew, which struck South Florida on August 24, 1992, is a good example of the level of devastation that can be expected from a catastrophic disaster. Hurricane Andrew is generally described as being compact in nature, fast moving, and producing very little rain, but having very high winds. It struck a moderately populated area of Dade County located just south of Miami.

According to the Response-After-Action Report prepared by the Federal Emergency Management Agency in May, 1993, the storm destroyed approximately 26,000 homes, leaving another 107,000 damaged. The majority of the over 100 mobile home parks affected by the storm were also destroyed. This devastation dislocated over 180,000 people and generated the equivalent of 30 years of solid waste accumulation in the Metropolitan Dade landfill.[1] The cost of debris removal alone totaled 540 million dollars as of July 19, 1993, which represented 57% of the federal public assistance funds obligated at that time.[2] The devastation included significant damage to the economic base and infrastructure (roads, bridges, electrical systems, water lines etc.) of the impacted area. Total damages from the storm , which relate to essentially one county in South Florida, currently exceed 25 billion dollars. If the storm had been slower moving, with higher moisture levels, and had impacted a more densely populated area of the state, such as nearby Miami, the damages would have been significantly greater.

If a storm similar to Hurricane Andrew struck the Tidewater area, it is highly unlikely only one county or city would be impacted. The devastation would clearly be regional in scope and the costs much higher than that experienced in South Florida. Recent estimates by the Insurance Institute place the cost of a storm similar to Hurricane Andrew striking the Hampton Roads area, and traveling through Northern Virginia (a likely scenario), at thirty to sixty billion dollars.

The Commonwealth of Virginia, its political subdivisions, and the federal government have an inherent responsibility to protect human life and property in times of disasters. **Although all levels of government play a critical role in responding to and recovering from disasters, the role of the State Coordinating Agency, the Virginia Department of Emergency Services, in coordinating response/recovery activities with local, state, and federal agencies, and the private sector, would be pivotal to the success of disaster operations. The State Coordinating Agency acts as a conduit through which local requests for assistance are made, and state and federal assets are coordinated and passed through to local governments, to support and carry out response and recovery strategies.**

State agencies and their resources, both human and material, provide the Commonwealth with the capability to respond to and recover from disasters in an effective and efficient manner. State agencies are assigned emergency tasks under the Commonwealth of Virginia's Emergency Operations Plan. Emergency tasks are related to the agencies daily responsibilities as well as capabilities. To ensure an expedient and coordinated response to disasters, the Department is continually working to enhance the level of emergency preparedness in the Commonwealth by striving to improve the integration, coordination, and overall quality of local and state emergency operations plans, as well as developing and implementing the necessary training and exercise programs to ensure their operational efficiency.

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[1] Hurricane Andrew, Response After-Action Report, FEMA, Page 15. May 1993

[2] FEMA, Joint Information Center, July 1993

The level of local and state preparedness will determine their ability to quickly identify disaster needs, assess damages, and carry out and support response and recovery actions. **It must be emphasized that the role of the federal government is clearly one of support. Local and state governments control response and recovery operations and only request federal assistance when their resources are depleted or if the situation overwhelms their capabilities. While all available federal assistance would be requested under the provisions of the Federal Response Plan and the FEMA State Memorandum of Understanding of 1993, it is never the less essential that the state have the capability to maintain control of these assets.** Therefore, it is critical that local and state governments have the facilities, resources, staffing, and training to carry out their emergency responsibilities under the plan.

To ensure that adequate resources will be readily available to effectively respond to and recover from a catastrophic disaster, Virginia developed, under the auspices of the Southern Governors Association, a mutual aid compact among all nineteen member states that comprise the Association. This agreement, which is the only one of it's kind in the country at this time, provides the framework under which mutual aid from other states will be requested, received, and utilized in times of disaster. Supplementary support agreements and procedures will be developed by member states to facilitate the implementation of the agreement once it is enacted. This process will begin with those states that are contiguous to the Commonwealth of Virginia. The Department of Emergency Services has already been in contact with the states of North Carolina, Maryland, and Tennessee in this regard.

The local, state, and federal components of Virginia's emergency management system, as well as the functional elements that comprise them, are linked vertically. This integrated and coordinated system is designed to allow for the free flow of information and interaction between the various levels of government to ensure the most efficient and effective use of resources in a disaster. As resources are depleted in a functional element of a particular level of government, the next level of assistance is activated. **The overall performance of the system depends on the level of preparedness of each component and of the elements that make up those components.**

Critical elements of a successful emergency management program include the following:

- An Emergency Operations Center that provides a central location where representatives from all governmental agencies, the private sector, and volunteer groups working as emergency support functions can collocate and coordinate their missions in an effective and efficient manner. This facility must have the capability to enhance the interface with the various network points and external systems so that effective actions and strategies can be developed and implemented in a timely manner.

- Integrated, multifaceted, redundant, and survivable communications and warning systems that provide the capability to communicate with all levels of government and to conduct emergency operations throughout all disaster phases.

- Plans, procedures, and supporting agreements that provide the framework for emergency operations and ensure a coordinated response.

- Staff to develop, maintain, and implement a viable emergency management program, and provide the capability of fulfilling the increasing emergency management program demands and responsibilities.

- Training and exercises to ensure a certain standard of operational efficiency locally, regionally, and statewide.

- Other tactical and programmatic components such as needs assessment, public education, hazardous material response, search and rescue, and donations management.

- Adequate funding to sustain the desired level of local and state preparedness, as well as support the additional federal initiatives designed to enhance response and recovery capabilities.

This study identifies and discusses the nature and scope of the strengths and the shortfalls of the various components of the Virginia emergency management system, especially as they relate to a catastrophic disaster. The Commonwealth has established a good foundation of emergency management programs. It is based on an emergency operations plan that has the capability to quickly and effectively interface with existing federal and local emergency operations plans. The plan is exercised and tested regularly under a variety of scenarios and in coordination with local, state, and federal government entities.

The Commonwealth has continually strived to improve upon and broaden its emergency management capabilities by implementing new and innovative initiatives in such areas as search and rescue and hazardous material response; upgrading its equipment and facilities; and enhancing the overall quality of its planning, training, and operational programs. However, many of these initiatives have been delayed, canceled, or phased in incrementally due to budget constraints at all levels of government. **Current and projected levels of local, state, and federal funding are insufficient to address the shortfalls identified in this report, as well as sustain an optimum level of emergency preparedness on the state and local level.**

The Commonwealth and its political subdivisions have been able to work around many of the system shortfalls identified in this report (e.g., communications, facility space, computer capabilities) due to the nature, scope, or location of previous disasters. **However, the deficiencies in the system would become glaring in a major or catastrophic disaster, especially if it occurred in a very populated and developed part of the state, such as the Tidewater or Northern Virginia areas.**

The study begins with a hazards analysis and a brief history of the types of disasters that have occurred in Virginia since 1969. It defines the different levels of

disasters and the corresponding levels of state and federal assistance. The components of Virginia's emergency management system are also described, followed by the assessment of the seven critical program elements previously identified.

A summary of the study's recommendations is provided at the end of the report. The key recommendations of this report, which are for the most part more capital intensive in nature, (e.g. EOC, data systems, communications equipment), are listed below. One of the key recommendations deals with the establishment of an Emergency Management Preparedness and Assistance Trust Fund, capitalized by a dedicated funding source, for the purpose of supporting state and local preparedness programs in order to enhance operational capabilities during a disaster. Without this, the challenge of meeting the increasing emergency management demands in the Commonwealth will likely go unmet.

If a dedicated funding mechanism is approved by the General Assembly, it is anticipated that it will take approximately one year to develop and implement the necessary legislation to enact the program. It will require another year to establish the organizational framework and procedures to collect and disperse the funds.

KEY RECOMMENDATIONS

FACILITIES AND DATA SYSTEMS

- Construct a new state Emergency Operations Center to enhance the overall efficiency of emergency operations in a disaster, as well as provide the necessary space for all key government and private agencies. **The current facility, which was built in 1951, cannot accommodate the expanded staff now required for less than catastrophic disasters. In catastrophic events, approximately two thirds of the estimated staff required would have to be put elsewhere, which would significantly inhibit continuity and coordination. The current facility has been evaluated by architectural firms and found to be less than one twelfth of the required size.**

- Develop the necessary computer systems at the Emergency Operations Center to interface with the various network points, as well as external systems, and allow for the free flow of information between them. The systems must be able to accommodate the anticipated huge volume of requests for resources and assistance that will be generated and processed during the course of a major or catastrophic disaster. The current system does not have the capability or capacity to do this.

- Provide the necessary staff support to service and maintain the expanded computer network to ensure its efficient use and minimize down time of the system during disasters. Initially, a computer programmer/analyst and a data entry technician will be required.

COMMUNICATIONS AND WARNING SYSTEMS

- Create, implement, and support a statewide Emergency Management Communications System that links local jurisdictions, state response agencies, and federal installations and has the capability to transmit data. The Virginia State Police digital microwave system or a satellite system could serve as the basis for such a system.

- Promote and support state agency and local government participation in the State Emergency Communications Using Radio Effectively (Operation SECURE) program. This is a high-frequency, single side band system used for intrastate, as well as interstate coordination, when telephone lines are not functioning.

- Provide the necessary staff support to service and maintain the communication system in place at the Virginia EOC, as well as deployed in the field.

FUNDING

- Establish an Emergency Management Preparedness and Assistance Trust Fund, similar to that of the State of Florida, with a dedicated funding source, to be administered by the Virginia Department of Emergency Services, for the purpose of supporting state and local emergency programs and initiatives. Florida's recent legislation is generating over 12 million dollars in funding annually to support local and state emergency management programs and initiatives. In Virginia, the estimated need to provide an adequate ongoing program is approximately $8 million. Note that this does not include funding for hazardous material programs or for capital outlay projects, such as the EOC and communications enhancements. By example, this equates roughly to what is currently being generated to support the Fire Programs Fund, described under Section 38.2-401 of the Code of Virginia, using a percentile assessment levied against selected insurance policies.

- Create a Hazardous Materials Administration Trust Fund, capitalized by a fee system imposed on the chemical user community, for the purpose of supporting hazardous material preparedness programs and initiatives as described in Sections 44-146.35 through 44-146.39 of the Code of Virginia. Almost fifty percent of the states have enacted some type of funding mechanism to support SARA Title III program requirements and hazardous material response initiatives.

HAZARDS ANALYSIS AND DISASTER HISTORY

Virginia is continually subject to a variety of natural and technological (man-made) hazards due to the following factors: its increasing population; its expanding and diverse economic base; an extensive transportation system (road, rail, air and ports); its topographical features; and varying climatic conditions.

NATURAL HAZARDS

Natural disasters that confront Virginia include floods, tornadoes, snowstorms, hurricanes, droughts, severe thunderstorms, and earthquakes. Historically, hurricanes have posed a significant and consistent threat to the Commonwealth of Virginia and are expected to continue to do so in the future. Recently, Hurricane Emily just missed Virginia's coastline after striking the Outer Banks area of North Carolina. As is reflected in Table 1, 121 hurricanes and tropical storms have impacted Virginia between 1871 and 1990, which averages out to be one storm per year.

The paths of sixty seven (55%) of these storms crossed directly over the state, while eleven (9%) either made landfall or came within sixty miles of Virginia's coastline. The decade of the 1950s had the greatest incidence of hurricanes and tropical storms since weather events have been officially recorded. Thirty eight percent of the storms that impacted Virginia in the past forty years occurred during this decade.[3]

Each storm is unique in terms of the level of winds, storm surge, and rainfall it produces, as well as the path it takes, which directly influences the kind and extent of devastation experienced. Although Hurricane Camille was no longer considered a hurricane by the time it reached Virginia in 1969, it generated record levels of rainfall in the western region of the state between the cities of Lynchburg and Charlottesville, causing extensive flooding, and claiming over 100 lives. Hurricane Hazel, which occurred in 1954, is remembered for the record wind gusts it produced along the east coast. The city of Richmond experienced wind gusts up to 79 MPH as a result of this storm. In 1979, Hurricane David spawned eight tornadoes in an area stretching from Norfolk to the Town of Leesburg. An 800 acre area of Norfolk called Willoughby Spit was formed as a result of storm surges of two hurricanes occurring in 1749 and 1806. According to the 1990 Census, Willougby Spit now has a population of approximately 3,969. This land area also provides support for a portion of I-64.[4]

The likelihood of Virginia experiencing a catastrophic disaster as a result of a hurricane, is significantly greater today for a number of reasons. According to meteorological experts, Atlantic hurricanes are expected to increase in frequency and intensity during this decade. Also, the level of development along Virginia's coastline is greater today than forty years ago. The eighteen coastal jurisdictions that have a high vulnerability to hurricanes are among the forty four jurisdictions

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[3] Virginia Storms, National Weather Service, Page 9-11, March, 1992

[4] Virginia Storms, National Weather Service, Page 11, March, 1992

in the state that have been called the "golden crescent." This area ranges from Fairfax County to Virginia Beach and has captured almost 95% of the state's population growth between 1980 and 1990.

If a storm similar to Hurricane Andrew struck the Hampton Roads area of Virginia, damages have been projected to total between thirty and sixty billion dollars. Although Hurricane Andrew caused record damages to south Florida, the devastation would have been considerably more had the storm tracked just twenty miles north of its actual path to around the Metropolitan Miami area, where population density and economic development are significantly greater.

Between 1969 and 1992, Virginia has had 12 disasters that required Presidential Declarations allowing for federal assistance to be made available to the state. As can be seen in Table 1, all of these events involved flooding and impacted anywhere from one jurisdiction to 106 jurisdictions. With the exception of the 1972 storm that affected Hampton, Newport News, and Virginia Beach, all of the disasters listed impacted the southwest and western portions of the state.

It should also be noted that most of the serious flooding problems in the southwestern and western parts of the state were the result of hurricanes. The most serious flooding disasters were precipitated by hurricanes that came up through the Gulf Coast. These include Hurricane Camille in August 1969, Hurricane Agnes in 1972, and remnants of Hurricane Juan in 1985. Fortunately, none of these storms struck Virginia's coastline directly.

There are essentially four types of flooding that can occur in Virginia: coastal, urban, flash, and river. Coastal flooding is usually associated with hurricanes or "Nor'easters" that strike the Virginia coastline. Urban floods are caused by a high volume of runoff over pavement that cannot be accommodated by existing storm drains, thereby quickly inundating streets and underpasses. Flash floods occur in the mountainous areas of the state where water from heavy rain is channeled into small streams and creeks, creating raging rivers in a short period of time. River flooding occurs as this water moves down the river basin.

Tornadoes, generally considered the most spontaneous and destructive natural disasters, are usually spawned by severe thunderstorms. Over 250 tornadoes have been reported in Virginia since 1950. Between 1953 and 1990, Virginia has been averaging about six tornadoes annually.[5] The tornado that just occurred in the Tri-Cities area on August 6, 1993, may rank as the strongest in Virginia recorded weather history.

Virginia is also susceptible to major winter storms. The most recent significant snowstorm occurred in March 1993 and affected 65 jurisdictions in Virginia. Snowfall amounts ranged from twelve inches to forty three inches with some unusually high snow drifts in some places. The storm, which claimed twelve lives, required a Gubernatorial State of Emergency and a Presidential Disaster

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[5] Virginia Storms, National Weather Service, Page 4, March, 1992

to provide the impacted jurisdictions with the necessary assistance to promptly and effectively respond to human needs.

Earthquakes are another natural hazard that is subject to occur in Virginia. Although earthquakes are not very common in recent time, Virginia has recently been assessed as having a moderate earthquake risk.

TECHNOLOGICAL HAZARDS

Although natural disasters pose significant challenges to Virginia's emergency management system, there are also a number of technological hazards that the state is confronted with on a daily basis.

There are a variety of hazardous materials that are used, manufactured, and stored at fixed facilities, as well as being transported by air, truck, rail, or pipeline throughout Virginia. Accidents at fixed facilities or along transportation corridors can impact population centers and the environment on a short-term as well as long-term basis. Hazardous material incidents reported to the Virginia Emergency Operations Center have increased dramatically. Between 1987, when the Virginia Hazardous Material Emergency Response Program was established and 1992, the number of hazardous materials incidents reported to the Virginia Emergency Operations Center (EOC) increased by 1,493 reports or 233 percent. This increase can be attributed to increased public awareness of the program and proper training, as well as the increased volume of hazardous materials being transported, stored, and manufactured throughout the state. Virginia's rail, roads, port, and pipeline facilities all handle and transport a variety of hazardous material, including high and low level radiological material, in varying amounts daily.

Virginia also has several areas of radiological risk. There are two fixed nuclear power generating facilities at North Anna and Surry that pose a potential risk to surrounding jurisdictions within the ten-mile emergency planning zones, as well as ingestion pathway jurisdictions within a 50-mile radius of these sites. A total of 63 Virginia jurisdictions are potentially at risk for this hazard. There are also potential hazards associated with the nuclear fuel facility at Lynchburg, the nuclear research reactor at Charlottesville, the military reactors in the Hampton Roads area, and the many industrial and medical facilities located throughout Virginia. In addition, the Hampton Roads ports regularly handle high level radioactive material.

OTHER SIGNIFICANT HAZARDS

Resource shortages, either contrived or natural, are another hazard that Virginia has experienced in the past (e.g. fuel crisis) and will continue to be vulnerable to in the future. Many of Virginia's essential resources come from outside its borders. Problems associated with resource production, transportation, or pricing could require emergency management of resources.

Terrorism is another hazard that Virginia must always be prepared to deal with effectively because of its potential to lead to civil disorder. Although it has not been very common in Virginia, it poses a significant challenge to emergency management

personnel in terms of preparedness, given the fact that the Commonwealth is home to many sensitive government and private facilities.

Although international developments have realigned the emphasis of emergency management planning toward natural and technological hazards, war caused disasters are still an area that emergency managers must address in their preparedness programs. If not by direct attack upon the United States mainland, the consequences of small engagements or uprisings in foreign lands causes repatriation of U.S. and other foreign citizens, as well as the return of casualties, that are beyond the ability of military facilities to deal with. Incidents like Desert Storm in 1991 present this type of problem.

LEVELS OF DISASTERS

The level of emergency operations established at the Virginia Emergency Operations Center (EOC) to coordinate and direct emergency response and recovery activities will be a function of the intensity, magnitude, and duration of the disaster event. Disasters can be defined in the context of three levels. The first level is the smallest in terms of magnitude and can be handled with minimal state and federal assistance. The State EOC would probably be capable of coordinating the state's response and recovery activities with very little augmentation to its daily staffing requirements. Established telephone and radio communications would be used to fulfill the state's coordination needs. The organization could be characterized as being more decentralized than centralized in nature. An example of this level of disaster would be the 1989 flood in Buchanan County (see Table 2).

The second level of disaster can be characterized as exceeding the response capabilities of one or more local jurisdictions and requiring a broad range of state and federal assistance. The response and recovery demands at this level would require centralized coordination at the State EOC. Agency staff would be augmented by a variety of state, federal, quasi-public groups, and volunteer organizations. The majority of the state's disasters listed in Table 2 would fall into this category.

The third disaster level can be defined as being catastrophic in nature and requiring massive amounts of state and federal assistance. Military involvement at this level is very pronounced, due to the immediate and massive resource demands required. As was indicated earlier, hurricanes are considered to be the most likely hazard in Virginia that would bring about a disaster of catastrophic proportions.

The probability of a disaster of this magnitude occurring in Virginia is becoming greater due to the anticipated change in the weather patterns, coupled with the population and economic growth that has taken place over the years. Disaster events that may have been manageable at one time will quickly overwhelm local and state capabilities.

Hurricane Andrew is a good example of a catastrophic disaster. This storm brought over $25 billion in damages to South Florida. As was pointed out earlier, the

storm's devastation would have been considerably more had it struck just twenty miles north where the population densities were higher. There is nothing in Virginia's recent history that compares to this devastation.

TABLE 1

INCIDENCE OF HURRICANES BY DECADE

DECADE	STORMS	
	AFFECTING STATE	PASSING DIRECTLY OVER
1871-1880	8	7
1881-1890	15	10
1891-1900	13	6
1901-1910	7	5
1911-1920	6	2
1921-1930	9	6
1931-1940	10	7
1941-1950	11	5
1951-1960	16	7
1961-1970	9	4
1971-1980	10	5
1981-1990	7	3
Total	121	67

Source: Virginia Storms, National Weather Service, Page 11, March 1992

TABLE 2

SUMMARY OF PRESIDENTIAL DECLARATIONS IN VIRGINIA

Month/Year	Event/Jurisdiction	Total $ Damages	FEMA Funds
August 1969	Hurricane Camille: (27 jurisdictions including Nelson County)	$ 100,000,000	$ 8,457,725
June 1972	Hurricane Agnes: 106 jurisdictions	$ 325,000,000	$ 16,814,643
September 1972	Storm/Flood: Hampton, Newport News, Va. Beach		$ 833,607 (Public Assistance)
October 1972	Flood: western, central, and SE portions of state (31 jurisdictions)	$ 22,000,000	$ 930,815
April 1977	Flash Flood: Southwest Va. (16 jurisdictions)	$ 227,000,000	$ 29,321,463
November 1977	Flood: Southwest Va. (8 jurisdictions)	$ 24,800,000	$ 3,873,666
July 1979	Flood: Buchanan County	$ 7,800,000	$ 3,632,531
September 1979	Flood: Patrick County	$ 17,000,000	$ 551,663
May 1984	Flood: Buchanan, Dickenson, and Washington counties	$ 7,000,000	$ 2,865,895
November 1985	Flood: 52 jurisdictions (Roanoke River Basin, James River Basin, and other areas)	$ 750,000,000	$ 19,325,290
October 18, 1989	Flood: Buchanan (private and public assistance)	$ 8,000,000	$ 4,228,890
April 21-24, 1992	Flood: 24 jurisdictions (western Virginia)	$ 21,570,956	$ 6,269,581
June 4, 1993	Wind storm: Lynchburg area (6 jurisdictions)	Pending	
August 6, 1993	Tornado: Tri-Cities area and southeast Virginia	Pending	

*Data obtained from Damage Assessment Reports; FEMA DMIS Report (2.4); DES Annual Reports; and an in-house document prepared by the Plans Division.

VIRGINIA'S EMERGENCY MANAGEMENT SYSTEM

Local, state, and federal governments represent the three components of the Commonwealth's emergency management system. Each component has a very critical role to play in the development and implementation of an integrated and coordinated emergency management program that will provide for the protection of citizens and property, as well as maintain essential services during times of disaster.

The emergency management system is organized to provide the flexibility to quickly respond to and recover from disasters that occur in an unpredictable manner and in varying degrees of severity at the local level. In order to accomplish this effectively, the local, state, and federal components of the system, as well as the functional elements that comprise them, are linked vertically. This integrated and coordinated system is designed to allow for the free flow of information between the various levels of government to ensure the most efficient and effective use of resources, both human and material, in a disaster. As resources are depleted in a functional element of a particular level of government, the next level of assistance is activated. The overall performance of the emergency management system depends on the level of preparedness, training, and resource capability of each component and the elements that make up these components. The local, state, and federal components of the emergency management system are described below.

LOCAL GOVERNMENTS

Local governments provide the first level of response in times of disaster. Each jurisdiction has an Emergency Services Director who is appointed by the local governing body. The governing body may also appoint a Coordinator of Emergency Services to assist in the development of the jurisdictions emergency management program. These individuals are responsible for developing and maintaining a viable emergency management program that will fulfill local government's basic responsibility of protecting its citizens in a disaster or emergency situation.

There are 139 political subdivisions in Virginia's emergency management network. Nineteen, or 14 percent, of the 139 jurisdictions have a full-time coordinator. Those jurisdictions that have a full-time coordinator are primarily the more urbanized areas with high population densities. The balance, or 86 percent, have part-time staff to develop and maintain their emergency management programs. These jurisdictions can be characterized as being generally more rural in nature.

Seventy-three of the 139 jurisdictions (53 percent) in the state receive assistance under the Emergency Management Assistance Program provided by Federal Emergency Management Agency (FEMA). This program is administered by the Virginia Department of Emergency Services. Initially, this program was designed to provide financial support to state and local governments for essential emergency management personnel and administrative expenses to include: salaries, benefits, travel, office supplies, administrative equipment, rent, maintenance of office space, utilities, and insurance. However, due to the current level of federal funding

provided for this program, financial support has basically been restricted to salaries and benefits.

The amount of funding received under this program varies from jurisdiction to jurisdiction and presently ranges from $2,000 to $54,000, with 53% of the jurisdictions participating in the program receiving less than $10,000 in assistance. **Although this funding may offset some of the local emergency management program costs, it does not provide the level of support required to attain and sustain the level of preparedness necessary to successfully respond to either a major or catastrophic disaster.** Also, keep in mind that only 52% of the states jurisdictions participate in the program as was indicated earlier. There is a clear need, therefore, for additional financial support to local jurisdictions in order to develop the readiness capability necessary for a catastrophic disaster.

As a result of limited funds made available for emergency preparedness purposes, the majority of jurisdictions rely heavily on the Virginia Department of Emergency Services to provide technical assistance and support in the development of local emergency operations plans, training, and exercise programs.

STATE COORDINATING AGENCY

The Virginia Department of Emergency Services (VDES) is the state coordinating agency for emergency response and recovery, planning, and operations. It is responsible for providing adequate warning to state and local agencies regarding potential incidents; coordinating the prompt and effective response by all state agencies to disasters; providing technical assistance to state agencies and local governments in developing the necessary plans, programs, and policies to support the response and recovery effort; and the administration of state and federal disaster recovery and assistance programs.

The role of the Virginia Department of Emergency Services is pivotal to the success of disaster operations in the Commonwealth. It acts as a conduit through which local requests for assistance are made, and state and federal assets are provided and passed through to local jurisdictions.

In order to more effectively fulfill its responsibilities to state agencies and local governments and enhance its coordination capabilities in a disaster, the Virginia Department of Emergency Services is organized functionally into five divisions. These divisions include Operations, Plans, Technological Hazards, Grants Administration, and Support. An overview of the various division program responsibilities is provided in Appendix A.

ROLE OF STATE AGENCIES

The Virginia Department of Emergency Services exercises operational control (tasking) of state agencies in a declared disaster. State agencies and their resources, both human and material, provide the Commonwealth with the capability to respond to and recover from disasters in an effective and efficient manner. State agencies are assigned emergency tasks under the Commonwealth of Virginia's Emergency Operations Plan. Emergency tasks are related to the agencies

daily responsibilities and capabilities. For example, the Virginia State Police is responsible for such things as providing law enforcement and traffic control, as well as augmenting communications in support of emergency services operations. The Department of Health is responsible for providing emergency health care to include the provision and operation of first aid stations, hospitals, and clinics, and establishing standards pertaining to the safety of food, milk, and drugs, etc. State agencies are responsible for developing the necessary subplans and standard operating procedures to carry out their responsibilities under the plan.

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

Just as the Virginia Department of Emergency Services is responsible for coordinating state agency response, the Federal Emergency Management Agency (FEMA) is responsible for coordinating the response of federal agencies, including the Department of Defense. It's responsibilities include coordinating federal preparedness, mitigation, response, and recovery operations to protect human life and property in times of disaster.

The Federal Emergency Management Agency provides a single point of contact for the states to facilitate the provision of a variety of federal services to enhance state and local capabilities, as well as provide direct assistance to effectively respond to and recover from disasters. Planning, training, and general guidance, as well as direct financial assistance, food, medical supplies, and items of equipment are examples of some of the services provided by FEMA to state and local governments.

CRITICAL ELEMENTS OF AN EMERGENCY SERVICES PROGRAM

The State Emergency Operations Plan and its supporting procedures and agreements provide the framework within which the state will implement its disaster response and recovery operations. The Federal Response Plan provides the same framework for the federal government and is discussed under the Planning section. This section also explains the state's functional alignment and how it will interface with the Federal Response Plan and local government.

Some of the other critical elements of a successful emergency services program are an adequate Emergency Operations Center, trained staff, communications systems, warning procedures, and data processing resources capable of supporting emergency operations at the Emergency Operations Center, as well as in the field. Also critical are a training program to ensure a certain standard of operational efficiency locally, regionally, and statewide; and an adequate level of funding to sustain the desired level of preparedness. Each element is discussed and assessed in the paragraphs that follow below.

At the local level these same elements must also exist, for it is here that the first response to a disaster will occur. **Except in unusual circumstances, state and federal programs will support, not supplant local programs and responsibilities.**

EMERGENCY OPERATIONS CENTER

An emergency operations center (EOC) provides a central location where emergency operations are directed, controlled, and coordinated in order to effectively respond to and recover from a disaster. The emergency operations center allows for representatives from all functional elements (state, federal, and volunteer agencies) involved in disaster response to collocate in a single facility and coordinate their response missions in an efficient manner, ensuring that critical needs are quickly recognized and addressed, while avoiding or minimizing any duplication of effort.

An EOC provides the necessary equipment and amenities to allow the functional elements to interface quickly and effectively, as well as carry out their missions in a prompt and coordinated manner. In order to fulfill its functional responsibilities, the EOC must have an integrated, redundant, multifaceted, and survivable communications system to support emergency operations.

The emergency operations center is also a repository for all disaster information, and as such, must have the capability to receive, process, disseminate, and display voluminous amounts of information in a timely manner. This capability is important in making the critical decisions, establishing the right priorities, and determining the proper allocation of resources during response and recovery phases of the disaster.

Local Emergency Operations Center

Local Emergency Operations Centers vary a great deal from jurisdiction to jurisdiction in terms of their physical plant, operating capabilities, and level of staffing. An EOC at this level could be a conference room or office, a police or fire station, or a facility that was specifically designed and equipped for that purpose. In most cases, communication systems are either located in or adjacent to these facilities. There is also quite a range of capabilities among local EOCs in terms of collecting, processing, and disseminating disaster information.

Some of the factors that influence the type of EOC a jurisdiction may have include: the size of the jurisdiction, the types of hazards to which it is vulnerable, their frequency of occurrence, the experience of the jurisdiction when they did occur, as well as financial capability. Regardless of what currently exists, each locality needs a facility with adequate space, communications, and other equipment and amenities appropriate to its level of hazard risk.

State Emergency Operations Center

The Commonwealth's Emergency Operations Center is a below ground facility located on the Virginia State Police headquarters property in Chesterfield County and is operated by the Department of Emergency Services. This facility, which was constructed in 1951, is approximately 4,700 square feet in area. **A 1988 architectural study prepared by Dewberry and Davis revealed that the Virginia EOC is one twelfth the size necessary to adequately accommodate and support the level of emergency operations in a major or catastrophic disaster.**

The EOC's current size is not sufficient to support the level of staffing and equipment required in a catastrophic disaster response operation. The Operations Room has space for approximately 35 people. This would equate to about seventeen work stations with two people assigned to each station. This arrangement necessitates other representatives from the various functional areas (including federal) and their support staff and equipment, to be dispersed to several temporary facilities. **Such an arrangement inhibits, rather than enhances, the necessary interaction and coordination of operational response personnel, and can easily result in misunderstandings and mistakes.**

In addition to this, the EOC does not have adequate space to conduct disaster staff briefings or provide for the needs of the media. Also, facility characteristics make the display of status boards, maps, and other graphic media very difficult (See Appendix B for additional information).

Ideally, the Emergency Operations Room should have space to accommodate 40-60 work stations to carry out the missions of the various functional groups. Each work station should be staffed with two or three individuals which would bring the total level of staffing in the operations room to approximately 80-180 people depending on the level of operation.

As an interim measure to support expanded emergency operations during a disaster, the Virginia Department of Emergency Services developed a cooperative arrangement with the Virginia State Police Training Academy to use their facilities. Although this arrangement may satisfy most of the space requirements for conducting emergency operations during a catastrophic disaster, it does not address many of the current problems associated with the Emergency Operations Center relative to communications systems, data systems, etc. The physical separation of staff under this arrangement will greatly exacerbate current coordination difficulties.

Even for major disasters that are less than catastrophic, responding state and federal agencies, and volunteer groups are now dispersed among several facilities and not collocated at a central facility. Their ability to coordinate their response missions effectively and share information efficiently is impeded under this arrangement. This would also be the case when the Virginia State Police Academy is used as was previously described. **These makeshift arrangements lead to misunderstandings, redundancy, and mishandling of response/recovery operations.**

The Virginia State Police Training Academy facilities are not presently equipped to support either the computer or communications equipment expected to be located at these sites. Equipment required to support emergency operations will have to be stored on-site, which will make regular maintenance and testing of equipment very difficult. This will seriously diminish the operational readiness of the equipment when it is activated.

These conditions, coupled with the fact that these facilities are only available in the event of a catastrophic disaster, preclude conducting periodic training at this site to identify potential organizational or operational problems.

Data Systems

The Emergency Operations Center must have a computerized data system in place capable of handling the volumes of information generated during the course of the disaster. Such a system should easily interface with the various network points, as well as external systems, and allow for the free exchange of information between them.

The Digital Equipment Corporation (DEC) system currently in place in the Emergency Operations Center is outmoded, difficult to use, and does not have the capability or capacity to adequately serve the needs of the Virginia EOC in a disaster situation or even in a more routine event.

The Virginia Department of Emergency Services is in the process of implementing a limited upgrade and expansion of its Local Area Network within the Emergency Operations Center. Computers to serve each of the functional stations in the EOC will be purchased during the upcoming year, with the assistance of the Federal

Emergency Management Agency, and will be in place and operational by the spring of 1994. The system will be designed to enhance emergency operations and to more effectively serve the operational demands placed on it during emergency situations. It is anticipated that the network will have the capability to accommodate approximately 256 workstations. Unfortunately, current EOC space restrictions will not allow for the best use of the system.

The Emergency Operations Center also has three data base systems in place that are designed to serve very specific functions in emergency operations. They include the Emergency Information System (EIS), the Transportation Emergency Decision Support System(TEDSS), and Computer-Aided Management of Emergency Operations (CAMEO).

All three systems described above can be characterized as subsystems of an overall Geographic Information System that has not been developed as yet. The data bases used in these systems are very limited at the present time. These systems are described in more detail in Appendix B.

Field Support

The Department of Emergency Services currently uses a 1979 Titan motorhome on a Dodge truck chassis that serves as a mobile command vehicle. This vehicle has been modified and retrofitted to serve as both a limited communications center and an administrative office to support agency emergency and disaster field operations. It is also designated to temporarily support the communication needs of an alternate Emergency Operations Center in the event the primary EOC becomes inoperable for any reason.

While inadequate as a mobile command vehicle, the 1979 Titan Motorhome also has other serious problems. The engine and transmission overheat with extensive use, particularly over mountainous terrain. The opening to the auxiliary fuel tank is not properly aligned with the opening provided on the vehicle body, making it very difficult, as well as potentially hazardous, to refuel the auxiliary tank. The vehicle has an LP-gas tank located just behind the left front wheel and below the driver's seat which presents a potential hazard for those who use it.

Due to its age and condition, this vehicle has had extensive maintenance problems in recent years, resulting in a lot of down time as well as high repair costs. Water leaks are a constant problem when it rains. In order to effectively serve the emergency needs of the Commonwealth and its political subdivisions, the Virginia Department of Emergency Services must have reliable and safe equipment to operate.

Recommendations

- **Construct a new Emergency Operations Center to enhance the overall efficiency of emergency operations in a disaster, as well as provide the necessary space for all key agencies (See Appendix C for space requirements and projected costs).**

- **Develop the necessary critical systems at the Emergency Operations Center that will accommodate the anticipated volume of information that will be generated and processed during the course of a major or catastrophic disaster.**

- **Expand the Emergency Operations Center Local Area Network to include other key state agencies.**

- **Study the feasibility of developing a Geographic Information System (GIS) designed to serve the emergency management needs of the Commonwealth, have the capability to interface with other systems, and is reasonable in cost.**

- **Replace the current Emergency Services mobile command post vehicle with a new 40-foot diesel-powered mobile command post vehicle, properly equipped and designed to meet state and local emergency services needs.**

COMMUNICATIONS AND WARNING SYSTEM

Communications

The ability to communicate is critical to conducting emergency operations. If local, state, and federal responders cannot communicate, they cannot support each other, and even the best emergency system will fail. In order to ensure the capability to communicate prior to, during, and following a disaster with all levels of government, private industry, volunteer groups, and the general public, the communication systems established locally, as well as statewide, must be integrated, multifaceted, redundant, and have the capacity to accommodate the increased demands placed on such systems during disaster operations.

The system should be transportable or mobile to service the disaster areas where the ability to communicate will be severely limited or non-existent following a catastrophic disaster. The system should be independent of any landline (wire) network and not be vulnerable to weather hazards such as wind or water, or geological hazards. The system should be designed to allow interoperability between local, state, federal, military, and volunteer response agencies.

LOCAL COMMUNICATION SYSTEMS

Local communication systems are designed to serve local needs, and in major disasters should be survivable and capable of interfacing with the state EOC. The type of system that a jurisdiction may have will depend on the needs of the jurisdiction, the area it is intended to serve, as well as the financial resources of the community. Local systems, like the state system, currently rely upon landline or microwave radio backbones to link their centers with remote transmitters. These backbone components are vulnerable to high wind and flood situations. It was these types of systems that were destroyed by Hurricane Andrew in South Florida, and contributed to a slower emergency response and relief effort.

Most of the elements that comprise a local communication system were developed to serve a specific function such as fire, police, and emergency medical services. Local systems have the capacity to handle daily traffic adequately. However, most systems will have difficulty in accommodating the demands placed on them during, and following a catastrophic emergency assuming they are still operational. The Amateur Radio Emergency Services and the Radio Amateur Civil Emergency Service are expected to support local communications needs in the event a system becomes non-operational for any reason. Both of these back-up organizations are volunteer groups.

STATE COMMUNICATION SYSTEMS

Virginia's communication systems, like most local systems, also rely on landline and microwave radio backbones to link their centers with the remote transmitters, which are vulnerable to a variety of hazards. The primary components of these systems that are linked to local jurisdictions include the following:

- Commercial telephone systems, including cellular systems, are used in daily operations for voice and data transmission, and are heavily depended upon for emergency operations as well.

- The Virginia Criminal Information Network, a computer controlled, law enforcement data communications system, operated by the Virginia Department of State Police, is used by the Department of Emergency Services to disseminate warnings and information to local governments and regional warning points, in addition to its primary criminal justice purpose.

- The Statewide Interdepartmental Radio System (SIRS) provides mobile local contact between law enforcement agencies.

- State Emergency Communications Using Radio Effectively (Operation SECURE) is a high frequency, single sideband radio system that is currently being phased in to enhance intrastate and interstate communication.

- A Virginia Department of Emergency Services specialized communications response truck provides both voice and data transmission capabilities and provides support to emergency operations in the field.

Other elements of the state emergency services communication system include Department of Emergency Services access to the Virginia State Police microwave and radio system, as well as the Federal Telephone System. The Amateur Radio Emergency Service and the Radio Amateur Civil Emergency Service provide backup to support both state and local communication systems, as was stated previously.

The Virginia Department of Emergency Services system includes linkages to the Federal Emergency Management Agency through a land-line teletype system, a high frequency, single sideband radio system that serves as a backup to the teletype system, and an internal telephone communications system. These systems are described in more detail in Appendix D.

There is also quite a mix of communication systems among other state agencies that respond to emergencies. All emergency response agencies have some internal communications system in place. State and local governments use standard frequencies extensively in their daily radio operations. There is a network of mutual aid channels available for use throughout the Commonwealth for fire, law enforcement, medical, and local government. The criminal justice agencies utilize SIRS, which was described above, to fulfill their communication needs between state and local law enforcement agencies. Oil spill response agencies use specific oil spill response communications in addition to internal agency systems. There are a variety of interagency agreements among state agencies for using and sharing frequencies, as well as other assets, during combined operations in disaster situations.

Virginia's communication system must overcome its dependency on landline and microwave systems in order to ensure the ability to communicate following a catastrophic disaster. Only transportable, survivable, high frequency radio or satellite systems will provide for and meet the communication needs and demands following a catastrophic event.

Warning System

Warning is another communication element that is critical to the population at risk. Warning systems have or are linked with a detection and monitoring component that notifies authorities of an impending hazardous situation. Some hazards allow for adequate warning to be made, such as hurricanes, whereas others like haz-mat incidents or tornadoes provide little or no opportunity for warning. Warning and notification systems are designed to provide continuous coverage so that risk populations can be advised of the proper protective actions to take in a timely manner.

LOCAL WARNING SYSTEMS

The type of warning systems that a jurisdiction may have depends in large part on the kind of hazards it is vulnerable to and the frequency of their occurrence. For example, jurisdictions that have frequent flash flooding would participate in the

Integrated Flood Observing and Warning System (IFLOWS). Communities around a nuclear power facility would be notified of an impending radiological emergency through the activation of sirens. Warning of a hazardous material incident or a tornado watch may be put out over the Emergency Broadcast System. Depending on the size of the area affected and the time constraints of the situation, all of these methods may be supplemented by door to door warning or bullhorns to ensure comprehensive coverage of the risk area.

STATE WARNING SYSTEMS

The primary warning system utilized in the Commonwealth is the Virginia Criminal Information Network which was described earlier under communication systems. The network includes linkages with almost all 138 local law enforcement offices throughout the state, the Emergency Operations Center, state and federal law enforcement agencies, as well as other criminal justice agencies in Virginia.

The National Warning System is used as the backup system to the Virginia Criminal Information Network. This system 's warning points include 26 localities, 10 Virginia State Police/Department of Emergency Services sites, two military installations, and eight National Weather Services Offices.

There are a number of hazard specific warning systems in place in the state. Nuclear Power Station Instaphone Networks serve the jurisdictions that are located within the ten-mile Emergency Planning Zones of the North Anna and Surry Nuclear Power stations. The ten-mile Emergency Planning Zone of the North Anna and Surry Nuclear Power Stations include five and six jurisdictions, respectively.

The Integrated Flood Observing and Warning System (IFLOWS) is a network of 240 rain and stream gauges distributed throughout 37 western and southwestern jurisdictions that is designed to provide early warning and notification of an impending flood. The system, which is radio based utilizing the Virginia State Police microwave network, includes voice communication capability between the 37 participating jurisdictions, the four Weather Service offices, and the State Emergency Operations Center.

The Emergency Broadcast System is an emergency public information system which is also used for warning. It is a network of public radio and television broadcast stations that have been authorized by the Federal Communications System to operate during an imminent or actual disaster for the purpose of transmitting emergency information to the general public. The Virginia Emergency Operations Center has direct links to the Originating Primary Relay Station, the Common Program Control Station, and the Primary Entry Point Station.

The National Oceanic and Atmospheric Administration, National Weather Service also disseminates weather forecasts and warnings throughout the state through its regional offices over the National Weather Service Radio System, with sites located across the Commonwealth.

Assessment of Communications and Warning System

As was indicated earlier, following a catastrophic disaster, local communication capabilities will be very limited or in some cases non-existent. The capacities of the remaining operating elements of the system will be quickly overwhelmed by the demand, essentially making them non-functional for use by emergency personnel. The impacted area will be looking for communication support systems from the state as well as surrounding jurisdictions.

Although the Commonwealth's communications and warning system is comprised of a variety of redundant land-line and microwave radio components, this redundancy does not necessarily ensure an operational capability of the system in times of disaster due to the very nature of its design.

Both the land line and microwave components are vulnerable to wind and water. Most of the antenna systems are fixed and not retractable, which will significantly impact upon their functional capability following a major disaster such as a hurricane. Few of the emergency power stations are capable of extended use under full load in a disaster. Some of the remote sites are not adequately equipped to handle extended demand that will be placed upon them in a disaster.

Most of the communication systems utilized by state agencies and local governments were developed for a specific purpose. This has led to a variety of subsystems that are made up of diverse equipment with varying capabilities.

The vulnerability of the system is exacerbated by the fact that many state agencies, as well as local governments, do not have alternate equipment, systems, facilities, or extra staff to support emergency operations in the event the current systems fail or become inoperable during a disaster.

Services provided by the Amateur Radio Emergency Services and the Radio Amateur Civil Emergency Service will allow a certain level of communication to occur between sites where they are established. However, their capabilities are not adequate to handle the overwhelming communication demands that will be present following a disaster. Also, since these are volunteer resources, the operators could well become victims of a major storm and therefore be unavailable.

VDES has a specialized mobile communications response vehicle that is equipped with a variety of communications resources that includes high frequency (HF), low and highband, civilian aircraft very high frequency (VHF-AM), marine, ultra-high frequency (UHF), and fixed cellular telephones. The vehicle also has a fixed telephone system, transportable cellular telephones, portable radios, and portable repeaters. Both voice and data transmission capabilities are available, as well as encryption for non-classified information. This equipment allows the vehicle to serve as a forward command and control vehicle and as the alternate EOC's

communications system provider. This specialized vehicle is available to assist state and local agencies with on-scene communications support.

Recommendations

- **Enhance the Virginia Criminal Information Network system, the primary warning system between state and local governments, to integrate National Weather Service information into a statewide enforcement/emergency management network. This eliminates the need to retype and reformat data, and speeds the transmission of warning information. This process should still be coordinated through the Virginia EOC.**

- **Expand and upgrade the existing Virginia Warning System to a survivable system with additional warning points in order to allow all localities and state response agencies access to instant voice communication.**

- **Encourage the use of the Telecommunications Service Priority System for critical local and state circuits. This service priority system allows critical communication circuits to be identified and repaired quickly in a disaster situation. This service is not currently in effect for local and state circuits due to its high costs. In addition to this, the effective strategies of diversity routing and site hardening of all state and local telecommunications services should be implemented on a routine basis.**

- **Promote and support state agency and local government participation in the State Emergency Communications Using Radio Effectively (Operation SECURE) program. This is a high-frequency, single side band system used for intrastate as well as interstate coordination when telephone lines are not functioning.**

- **Develop and provide funding assistance for communications systems that service regional needs while allowing for emergency access by state response agencies as needed.**

- **Create, implement, and support a statewide Emergency Management Communications System that links local jurisdictions, state response agencies, and federal installations, and has the capability to transmit data. The Virginia State Police digital microwave system or a satellite system could serve as the basis for such a system.**

- **Install mutual aid radio channels that are provided for by the Federal Communications Commission under the National Public Safety Plan.**

PLANNING

Plans provide the framework for disaster response at all levels of government. Plan development today is based on a broad, functionally oriented, multi-hazard approach and designed to interface with federal plans. This program recognizes that there are common functional elements that exist in all emergency operations, such as direction and control, communications and warning, public information, etc. This system has the flexibility to adapt to a variety of hazards which ensures a cost effective emergency management capability at all levels of government. If properly developed and implemented, this program will reduce the degree of risk, while enhancing the capability to respond to and recover from any type of disaster.

However, depending on the nature of the hazard, a hazard specific plan may be developed to supplement this multi-hazard approach to plans, such as for hurricanes, chemical emergencies, and nuclear power facilities.

Local, state, and federal plans define their objectives, describe the response organization necessary to achieve their objectives, and explain the concept of operations that will be used in carrying out their responsibilities under the plan. Specific departments and agencies are tasked with responsibilities under the plan. Administrative and logistical issues are addressed and the appropriate laws and authorities to develop and implement the plan are referenced.

The organization, staffing, and resources of each functional area are described in supporting annexes to the plan. These plans usually include hazard specific appendices to address hazards that may be unique or pose a significant threat to the level of government the plan pertains to.

Federal Response Plan

The Federal Response Plan defines the fundamental assumptions and policies under which the federal government will operate, and establishes an organizational framework and a concept of operations that are designed to facilitate the delivery of federal response assistance to state and local governments.

The plan categorizes the myriad types of assistance that state and local governments could need in responding to and recovering from a disaster under 12 emergency support functions, hereinafter referred to as ESFs. Each ESF has a designated lead agency that is responsible for ensuring the fulfillment of mission assignments tasked during the response phase of the disaster. This will be accomplished with the cooperation of other federal agencies that are designated to support the 12 emergency support functions. The emergency support functions are as follows: Transportation, Communications, Public Works and Engineering, Fire Fighting, Information and Planning, Mass Care, Resources Support, Health and Medical Services, Urban Search and Rescue, Hazardous Materials, Food, and Energy.

As a result of Hurricane Andrew, these 12 ESFs will be grouped functionally to enhance the coordination and delivery of assistance. For example, the ESFs of Fire,

Hazardous Materials, and Urban Search and Rescue will be grouped under the function of Emergency Services. The plan also includes three support annexes dealing with financial management, public information, and congressional relations. The Federal Emergency Management Agency is responsible for overall development, coordination, and implementation of the plan.

The Federal Response Plan establishes nine operating facilities, seven of which are deployment sites, to effectively carry out the objectives of the plan. The seven deployment sites include the point of departure, point of arrival, assembly point, mobilization point, marshaling area, staging area, and base camp. The two main operating facilities are the Regional Response Center and the Disaster Field Office which are explained below.

The Regional Response Center is the initial point of contact in the region for the impacted state(s) as well as the federal agencies who will be supporting the response and recovery effort. The Regional Response Center for Region III, which is the FEMA region that Virginia is a part of, is located at the FEMA Regional Office in Philadelphia.

The Disaster Field Office (DFO) is a key facility established under the Federal Response Plan. This facility serves as the location from which state and federal response and recovery operations will be coordinated throughout the duration of the response and recovery phases. The Disaster Field Office established following Hurricane Andrew housed over 2,000 people. The DFO is a temporary facility housing both state and federal workers. It is located in or near the disaster area, and is considered a field extension of the state Emergency Operations Center.

State Emergency Operations Plan

Since the Federal Response Plan is designed to augment state and local governments' response efforts, the state's response organization must be structured, to the maximum extent possible, like the Federal Response Plan, in order to enhance the coordination of response activities and facilitate the delivery of federal assistance to the disaster area.

The State EOP describes the state organization, the concept of operations, and provides general and specific tasking responsibilities to state agencies. The state plan has been modified in recent years to reflect a functional organization and to more closely align itself with the Federal Response Plan. The Hurricane Emergency Response Plan, which was just recently developed, is organized along functional lines and serves as a good example of how state plans coincide closely with the Federal Response Plan organization.

A key characteristic of these plans is that they are structured to quickly and effectively interface with the Federal Response Plan in order to facilitate the identification, mobilization, and deployment of federal assets into the state following a disaster, and to minimize duplication of effort.

The State Emergency Operations Plan tasks state agencies with various response and recovery responsibilities in a disaster to include preparing the necessary subplans and standard operating procedures to support the plan, and with providing agency staff with the necessary training to carry out their operational responsibilities effectively and efficiently. As was indicated earlier, state agencies have been grouped into emergency support functions similar to the Federal Response Plan. Table 3 illustrates the functional alignment of state agencies tasked under the plan.

State agencies that are more closely aligned to emergency functions on a daily basis, such as the Office of Emergency Medical Services in the Health Department, tend to be further along in their planning and training for disaster operations than most agencies whose daily responsibilities are not emergency oriented. Consequently, there is quite a range in the level of preparedness and operational capabilities of the primary and support agencies of state government in each functional area.

Local Planning

Each locality is required by state law and federal regulations (if they accept federal emergency preparedness assistance) to develop and maintain an Emergency Operations Plan. The local Emergency Operations Plan serves as a basis of the local emergency management program, especially in response to a disaster or large scale emergency situation.

Local plans, like state and federal plans, are based on the integrated emergency management system which is essentially an all-hazard approach to planning. Plan development and maintenance is usually the responsibility of the local emergency services coordinator, who for the majority of jurisdictions in the state is a part-time individual. In many cases the local emergency services coordinator does not have the staff support or resources to develop and maintain a comprehensive and viable emergency operations plan. Some jurisdictions rely solely on the emergency manager to develop the local plan, whereas others establish and designate an emergency management committee to be responsible for plan development. In either case, due to the level of support and funding provided by local governments for emergency management planning, the majority of the jurisdictions rely on the technical assistance provided by the Virginia Department of Emergency Services to develop their plans.

Assessment of Planning

Local plans provide the organization and the readiness capability to respond effectively in the initial stages of a catastrophic disaster. The focus of the initial response is primarily on such functions as evacuation, emergency transportation, sheltering, food, and health services. These functions are traditionally looked upon in the context of a local perspective rather than regional. Plans that are strong locally may not be regionally. As was demonstrated in Hurricane Andrew, there is a significant need to broaden the scope of local planning efforts to include and address regional and interregional considerations in disaster planning. Catastrophic

disasters, more than any other level of disaster, demands regional and interregional approaches to response and recovery.

Following the disaster, local response and recovery capabilities will be very limited. The local focus will be principally to identify needs and coordinate the delivery of resources from state and federal governments, private industry, quasi-public groups, and volunteer agencies. Local jurisdictions must have the capability to substantially augment their plans to properly interface with the state and federal response plans.

There is a need for the Commonwealth to be able to interface quickly and effectively with the federal government in the event of a catastrophic disaster. There have been significant strides made in recent years to align the state plan with the federal organizational framework in order to facilitate the flow of assistance into the state following a catastrophic disaster. However, the state has been unable to keep up with the many new federal initiatives implemented following Hurricane Andrew to address the shortfalls identified, as well as enhance local, state, and federal response and recovery capabilities.

All state agencies have a person designated to address emergency management issues that pertain to their functional area. This person usually is responsible for developing and maintaining the agency disaster plan, preparing the standard operating procedures to support the plan, ensuring staff receive the proper training, and coordinating their agency disaster response operations once the plan is implemented. The emergency services responsibilities of these individuals, like many of their counterparts on the local level, are secondary to their primary duties. Also, many, if not most, of these people are only one deep, meaning augmentation will be necessary for twenty four hour operations.

There is a lack of adequate funding and staff support to provide the necessary technical assistance to local governments and state agencies in the development of their plans, standard operating procedures, and training programs. Current funding and staff levels make it very difficult to ensure that local and state personnel beyond the first level of responders, have a good understanding of their role in a disaster and how they will interface with other response components.

Recommendations

- **Provide additional technical assistance to state agencies and local governments in the development of the necessary plans, subplans, and standard operating procedures, to support the State Emergency Operations Plan.**

- **Broaden the scope of local planning initiatives to include regional and interregional provisions. Plans that are very strong locally may not be regionally. In a catastrophic disaster, issues such as evacuation, sheltering, resource deployment, and alternate operational facilities are regional and statewide in scope. Local planning and training programs have a tendency to focus primarily within jurisdictional borders.**

- **Develop a consistent, integrated, and coordinated program of assistance to local governments in the various emergency planning program areas. The level of assistance now provided differs between program areas due to the varying levels of funding and resource support provided. For example, the capabilities of the Radiological Emergency Response Program in planning, training, and resource support are significantly greater than that of the Chemical Emergency Preparedness Program.**

Table 3

STATE AGENCY FUNCTIONAL ALIGNMENT

ESF	Federal Agency	State Agency
Transportation	Department of Transportation	Secretary of Transportation
Communications	National Communications System	Department of Information Technology
Public Works and Engineering	Department of Defense (U. S. Army Corps of Engineers)	Department of General Services/Department of Housing and Community Development
Firefighting	U. S. Department of Agriculture (Forest Service)	Department of Fire Programs
Information and Planning	Federal Emergency Management Agency	Department of Emergency Services
Mass Care	American Red Cross	American Red Cross/ Department of Social Services
Resource Support	General Services Administration	Department of General Services
Health and Medical	Department of Health and Human Services (U. S. Public Health Service)	Department of Health
Urban Search and Rescue	Department of Defense	Department of Emergency Services
Hazardous Materials	Environmental Protection Agency	Department of Environmental Quality
Food	U. S. Department of Agriculture	Department of Agriculture and Consumer Services
Energy	Department of Energy	Dept. of Mines, Minerals, and Energy/ State Corporation Commission

SOURCE: Commonwealth of Virginia Emergency Operations Plan, Virginia Hurricane Response Plan, Page I-FF-11, June 1993

STAFFING

The field of emergency management has evolved from a single hazard discipline in the 1950's, focusing principally on civil defense issues relating to nuclear attack, to a comprehensive, multi-hazard program with a host of programmatic requirements in planning, training, and exercising. As disasters occur throughout the nation, shortfalls are identified, new initiatives are implemented, and programmatic requirements that state and local governments must comply with become more detailed and stringent (i.e. hurricane, radiological, and chemical emergency preparedness programs). **Adequate staff levels are essential to developing and maintaining a viable emergency management program.**

Local Staffing

The roles and responsibilities of local emergency management coordinators have grown significantly over the years. However, in most jurisdictions, the staffing levels to administer and support local preparedness programs have experienced very little change. As was stated earlier, eighty six percent of the 139 political subdivisions in the state have a part-time coordinator to develop and maintain their emergency management program. Only fourteen percent employ a full-time coordinator. Many of the local emergency management offices do not have adequate clerical or secretarial support, and resources to develop their own plans, provide the necessary training, and fulfill the increasing programmatic requirements of emergency management programs.

During emergency operations, local jurisdictions, like the state, augment their staffs by drawing upon other departments. In some cases, an actual disaster is the first time that support staff is exposed to their emergency role and responsibilities. Staff's capabilities and effectiveness in performing their duties during a disaster is directly related to the level of training provided to them prior to the event.

State Staffing

State emergency operations are conducted with a core staff provided by the Virginia Department of Emergency Services, and augmented by personnel from other state agencies. This arrangement has been successful in supporting the level of emergency operations necessary for the kinds of emergencies Virginia has had to deal with in the past. In prior disaster operations, it was possible to utilize the same staff in a variety of functions in both the response and recovery phases of emergency operations. **However, in a catastrophic disaster, the duration of the response and recovery phases will be extended due to the level of devastation, thereby precluding the possibility of utilizing the same staff for both operational phases.**

Assessment of Staffing

To adequately support emergency operations through the response and recovery phases of a catastrophic disaster, a greater number of trained

personnel will have to be available for longer periods of time at both the local level as well as the state level.

Also, there are a number of new initiatives being developed at the federal level to address the shortfalls that materialized during the response and recovery operations of Hurricanes Andrew, Hugo, and Iniki. The present staff levels at the state level, and in the majority of cases at the local level, are inadequate to meet the growing demands in emergency services planning, training, and operations. There is clear need for additional staffing to:

- Service the communication system in place at the state EOC, as well as deployed in the field.
- Develop and maintain the expanded computer network at the state EOC to ensure its efficient use and minimize the down time of the system during disasters.
- Provide the necessary technical assistance to state agencies and local governments in the development of emergency operations plans, subplans, and standing operating procedures.
- Support the training needs of state agencies and local governments.
- Coordinate and conduct public awareness/public education programs throughout the state.
- Facilitate and expedite the processing of disaster claims.
- Assess the damage and disaster needs of the impacted jurisdictions.
- Maintain an appropriate level of response capability for hazardous material incidences.
- Enhance the Commonwealth's search and rescue capabilities.

Recommendations

- **Develop and support an appropriate level of emergency management staffing to establish and maintain an acceptable local and state level of preparedness. Contingent upon the availability of adequate funding support, every jurisdiction with a population of 25,000 or greater, should have at a minimum, a full-time emergency services coordinator.**

Specific state emergency management staff needs include:

- **A computer programmer/analyst and data entry technician to service and maintain the expanded computer network.**

- **Three technical and maintenance personnel to service and maintain the communication system at the EOC and in the proposed six regional field offices.**

- **Four planners and five trainers to support the recommended regional network and better serve the needs of local jurisdictions and state agencies.**

- **An additional public information officer who will be responsible for coordinating public information/public awareness programs throughout the state.**

- **One additional search and rescue individual to assist in the administration, training, and response elements of the program.**

- **Three additional haz-mat technicians to better serve the Tidewater, north central, and southwestern areas of the state. Two additional people to support Hazardous Material Training.**

- **One additional person to support increased demands of the public and individual assistance programs.**

TRAINING

Maintaining local and state control is critical to successful disaster response and recovery. Training and exercising are important in developing the ability to establish as well as maintain control of disaster response and recovery operations. Trained and knowledgeable personnel are essential for the prompt and proper execution of the state and local emergency operations plans and subplans. It is critical that all response personnel have a thorough understanding of their assigned responsibilities in a disaster situation, as well as how their roles and responsibilities interface with the other response components of the plan or subplan. Without trained and knowledgeable staff to develop and maintain plans, as well as support and carry out response and recovery efforts, the success of any emergency management program is jeopardized.

Local Training

The majority of local emergency management training conducted by local jurisdictions is focused on specific functional areas such as law enforcement, fire, and emergency medical services. Exercises are conducted periodically to familiarize local government personnel with the jurisdiction's emergency operations plan, as well as their role and responsibilities in disaster operations. Selected local personnel also participate in the training programs offered by the state and federal government.

State Training

Training programs provided by the state are attended principally by those local government individuals who are responsible for maintaining their agency's emergency management program. Training currently reaches a very limited number of state agency personnel, and outside of the search and rescue, hazardous materials, and Red Cross communities, not much training is provided to volunteers.

It should be pointed out that training in some areas, such as the Commonwealth's search and rescue program, has been severely curtailed in recent years due to major reductions in state funding. As a result, the number of trained volunteers and instructors to support the Commonwealth's search and rescue program has been steadily declining since 1990. There is a definite need to ensure a certain level of response capability in critical program areas such as search and rescue.

Federal funds support the Virginia Department of Emergency Services training effort either in part or in whole, depending upon the program offered. Because the state's program is, for the most part, federally funded and based in large part on a federal curriculum, the courses and the exercises developed must be structured and presented to comply with federal guidance, as well as fulfill federal objectives. Although the FEMA training curriculum provides basic emergency management training, it was not designed nor intended to fulfill all the training needs of the Commonwealth and its political subdivisions.

The Virginia Department of Emergency Services needs to develop a training and exercise program that is tailored to the needs of the Commonwealth. The federal curriculum now used should be one component of the overall training program, but it should not be the primary focus of state training as it is now.

There is a general need in the emergency management field for a centralized training facility designed to service and support the needs of the various disciplines that comprise the field of emergency services, to include search and rescue, fire, emergency medical service, and law enforcement. This facility would house a library of books, publications, and videos pertaining to the diverse subject matter of emergency services.

Assessment of Training

The current training program is essentially one-dimensional in nature. That is, it is generally attended by response-oriented personnel from local jurisdictions and state agencies who have a fairly good grasp of their role and responsibilities in an emergency situation. In many cases their emergency task will be very similar to, or the same as, their current job responsibilities. Existing training is generally designed to establish a baseline of fundemental knowledge and understanding of the field of emergency management. While this is essential, current resources do not permit an expanded training program that reaches non-routine responders.

In previous emergency and disaster situations, state agencies and local governments have had adequate staffing to perform their emergency responsibilities during the course of the event. **However, in a disaster of catastrophic proportions, state agencies and local governments will be required to have a cadre of trained personnel to staff the various functional areas during all operational shifts for an indefinite period of time. This will require a training program that goes beyond the usual first level of responders. The need here is for an expanded training force to support this effort.**

There is a significant shortfall in the current training program in the area of developing programs for people who will be tasked with emergency duties that are not necessarily associated with their daily jobs. For example, in a disaster there will be many people who will be brought in to augment local as well as state staff in various areas (i.e., rumor control, action officers, etc.). A training package should be in place to provide expedient training to these individuals.

Extensive cross-training programs should be developed and implemented for local and state personnel who will be expected to perform a variety of functions in a disaster such as personnel who may be designated as action officers in the initial stages of response, but may serve as Disaster Application Center managers or augment rapid needs/damage assessment teams as the disaster response phase progresses. Cross-training will also help in understanding the responsibilities and special needs of the various functional areas on the state and local level by the staff. All appropriate parties should be involved in the development of training programs.

Recommendations

- **Design and implement a comprehensive, integrated, and continuous training program that is specifically tailored to the needs of department personnel, state agencies, local governments, and volunteer support groups. Training programs in the past have relied heavily on FEMA's curriculum and program requirements, rather than state developed training tailored around local, regional, and state needs.**

- **Develop detailed training manuals and operational guidelines to fulfill expedient training needs as well as programmatic needs. In catastrophic disasters, staff requirements will be significantly greater than in most disasters Virginia has experienced in recent history. This situation will require innovative training programs that are quick, comprehensive, and effective in communicating the basic requirements of the task at hand to the augmented staff.**

- **Develop a statewide cadre of qualified local instructors for many more basic or advanced training programs.**

- **Establish a multi-disciplinary emergency management training facility designed to serve and support the various disciplines that comprise emergency services.**

OTHER SIGNIFICANT ELEMENTS OF AN EMERGENCY MANAGEMENT PROGRAM

Donated Commodities and Volunteer Services

Critical resources will be in short supply or unavailable in the disaster stricken area. In order to fulfill the immediate needs of the impacted population, as well as fulfill local and regional recovery priorities, resources and services will have to be brought in from outside the disaster area.

Properly managing donated goods and services is only one element of the resource management function. However, if the proper plans and procedures are not in place prior to the disaster, unsolicited donations and services will create significant storage, transportation, distribution, and disposal problems for emergency response personnel, as was experienced following Hurricane Andrew and in Hurricane Hugo.

ASSESSMENT OF DONATED COMMODITIES AND VOLUNTEER SERVICES

A donations management plan has been developed for the Commonwealth as a result of the hurricane preparedness program. The Department of Social Services has been tasked to manage this program. However, the necessary staffing, resources, supporting systems, and procedures to implement the plan have not been identified or developed as yet. A committee has been established to develop the plan further in order to make it functional.

RECOMMENDATION

- **Continue to identify, develop, and coordinate the necessary resources, systems, and personnel to implement the Commonwealth's donations management plan, as well as manage volunteer services effectively and efficiently. Some level of financial support should be provided to purchase the necessary hardware and software.**

Evacuation and Shelter

The prompt and effective evacuation of high risk areas requires the cooperation and coordination of many departments and agencies locally, regionally, as well as statewide. The components of an effective evacuation include the following: a comprehensive public information program prior to, during, and following the disaster situation, adequate warning, direction and control, clear identification of risk areas and the evacuation routes that service these areas, traffic control along critical roadway segments and intersections, security of evacuated areas, the identification of safe and secure shelters, as well as the proper management of these facilities. The Virginia Department of Emergency Services will be coordinating this effort in cooperation with local governments in a catastrophic disaster. Shelters must be identified both within and outside of the affected areas.

ASSESSMENT OF EVACUATION AND SHELTER

Existing plans and procedures for evacuation and shelter operations have been evaluated at the state and local levels. The Department of Social Services, and the Red Cross, are currently revising their shelter plans and training programs to enhance their shelter operations and capabilities during a disaster. The Virginia Department of Transportation is currently involved in developing a transportation evacuation plan for the Tidewater area in the event of a hurricane. Many of the same basic strategies and actions developed for the Tidewater area will be utilized in other areas of the state in response to and recovery from catastrophic disasters.

RECOMMENDATION

- **Enhance the coordination of evacuation and shelter plans locally, as well as regionally, in order to better serve the needs of the risk population and ensure the success of these critical operations.**

- **Develop and implement more comprehensive shelter management training programs tailored to the needs of local governments.**

Hazardous Materials Response and Training

The Virginia Department of Emergency Services Technological Hazards Division is responsible for hazardous materials response in Virginia. In establishing the Hazardous Materials Emergency Response Program, the Virginia Department of Emergency Services had to assess the hazardous response needs of each political subdivision, develop a regional program that addressed the needs identified, and define the various program requirements that had to be fulfilled by participating jurisdictions in order to make it a viable program. Thirteen locally based hazardous materials regional response teams were established to serve the hazardous material response needs of the Commonwealth. The Commonwealth provides funding support to these teams for the purpose of purchasing replacement and new equipment. The level of funding support has decreased substantially since program inception. This is especially significant relative to the higher costs associated with the increasing number of responses.

In addition to these teams, the Virginia Department of Emergency Services has ten hazardous materials officers who are equipped and trained to respond 24 hours a day year round, in support of local governments, other state agencies, and with regional response teams at the request of local officials. Haz-mat officers also provide training, technical advise and assistance, and serve as liaisons to local coordinators and teams. The Department of Environmental Quality is responsible for any long-term remediation of hazardous material sites once the immediate risk to the public's health and safety has been addressed by haz-mat emergency response personnel.

ASSESSMENT OF HAZARDOUS MATERIALS RESPONSE AND TRAINING

The first three years of program funding were adequate to develop, operate, and maintain the hazardous materials response program. However, funding for the subsequent years that followed has been less than adequate to maintain a standard level of response capability throughout the state.

Between 1987 and 1992, the number of hazardous materials incidents reported to the Virginia Emergency Operations Center increased 233%. The number of on-scene responses by hazardous materials teams increased 573%. In addition to this increased demand for services, the state has become more involved in recent years, as the on-scene coordinator at EPA sites within the state. This has created the need for more sophisticated sampling and monitoring equipment as well as additional staffing, to include three FTEs in the response area and two FTEs in training (See Appendix E for additional background information). Due to inflation and cost increases for new and replacement equipment, the level of support in real dollars has actually decreased to these teams.

Also, the hazardous materials training program is currently structured to serve the hazardous materials response teams. However, due to new OSHA regulations, the Department has determined that there is a need for an expanded training program that will reach first responder personnel throughout the state.

RECOMMENDATION

- **Develop a dedicated funding source for hazardous materials preparedness and response programs to meet the increasing demands in this area and maintain an appropriate level of readiness.**

Search and Rescue

The Commonwealth's search and rescue organization is eclectic in nature in that it draws upon the resources and expertise of a variety of groups such as volunteer canine teams, Civil Air Patrol, law enforcement officials, Appalachian Search and Rescue, and the Virginia National Guard. It should be pointed out that the Civil Air Patrol, which is comprised totally of volunteers, is the Commonwealth's primary resource in air search and rescue. Continued state support to this program is essential to maintaining this resource. The cost to replace this resource capability with state equipment and personnel would simply be prohibitive due to the level of funding required.

The Virginia Department of Emergency Services serves as the Commonwealth's search and rescue coordinating agency. All of the major SAR groups in the state have executed a formal memorandum of understanding with the Department that defines their role and responsibilities in a search and rescue incident coordinated by the state. Each local jurisdiction may designate a local Search and Rescue Coordinator, who is usually the chief law enforcement official of the jurisdiction.

Two of the 25 national Urban Search and Rescue Task Forces are located in Virginia. These teams are designed to perform the major functions of search, heavy rescue, emergency medical care, and the associated technical and support functions. At present, this is a FEMA sponsored program, but little money is available to support it. This resource is available for state use during an emergency, but all costs associated with it will be borne by the state.

ASSESSMENT OF SEARCH AND RESCUE

As is indicated above, the Commonwealth's search and rescue program is based upon the services and resources of a variety of volunteer groups who are expected to give of their spare time to train for and respond to incidents throughout the Commonwealth. In some cases, these volunteers cover their own costs associated with training, as well as with the response to the incident.

Training is a major component of Virginia's search and rescue program. It takes approximately three years to develop a search and rescue manager. The pool of capable SAR managers that the state can call upon in a disaster is already beginning to decline due to the lack of a comprehensive and continuing training program. This is at a time when the demand for such services is increasing and the scope of their responsibilities is expanding. The basic problem is lack of money and staff to develop and deliver the necessary training to maintain a cadre of trained personnel for this function (See staffing recommendations on page 33). These factors are making response to search and rescue incidents more and more difficult.

RECOMMENDATION

- **Provide adequate and stable funding to develop, promote, and sustain Virginia's growing search and rescue responsibilities and initiatives so that this predominately volunteer force can be properly trained.**

Public Information/Public Education

The Public Information Office (PIO) of the Virginia Department of Emergency Services is responsible for developing plans and procedures to effectively communicate with the general population, the population at risk, and the media in a timely, accurate, and consistent manner during emergency and non-emergency times. The dissemination of emergency relief information is most essential following a disaster.

One of the programs the Public Information Office is responsible for developing and conducting is the disaster awareness program. This program describes the various hazards that the Commonwealth may be confronted with and educates the public on the appropriate protective actions to take in order to survive the various hazards that could occur in the state.

To support the public awareness and preparedness programs, the PIO conducts training programs and works closely with agency personnel and local emergency managers, and quasi-public groups to design, produce, and disseminate emergency

preparedness publications to the general public, the population at risk, and special population groups as well as facilities.

ASSESSMENT OF PUBLIC INFORMATION/PUBLIC EDUCATION

The demands placed on the public information office have grown significantly over the past several years in the areas of program administration, training, and public awareness and education campaigns. During this same time, funding to support many of these initiatives has been reduced. Although the Public Information Office has met the challenge of fulfilling the various program responsibilities it is tasked to do, some program needs have been compromised to address the immediate demands of new initiatives and programs that have been established.

The public awareness and education program of the Public Information Office is one of these programs. The PIO function is currently promoting and coordinating all activities associated with the FEMA family protection and preparedness outreach program which assists families in preparing for all types of disasters. However, it does not have adequate staff to conduct the necessary training for this program, as well as fulfill its other program responsibilities.

RECOMMENDATION

- **Provide the necessary staff and financial resources to support the increasing demands placed on the emergency public information office, especially in the family protection program area, and in emergency public information training for local government personnel.**

Needs/Damage Assessment

Accurate and timely damage assessment will facilitate the delivery of disaster assistance to the disaster area. The Commonwealth does have a damage assessment program in place based on a 24 and 72 hour time-frame. However, due to the level of destruction anticipated in a catastrophic disaster, the Commonwealth must also develop the resources and capability to quickly and effectively assess local and regional response needs following a disaster. The differentiation here is between traditional damage assessment for long term recovery purposes and immediate needs assessment for short term response. Virginia and its localities have always done some degree of needs assessment, but never on the scale like that required by a catastrophic event.

ASSESSMENT OF NEEDS/DAMAGE ASSESSMENT

The Commonwealth must have the capability to identify the extent of damages, make an accurate assessment of need, and develop response priorities within six to twelve hours following a disaster in the following key categories: essential needs (i.e. food, water, housing, shelter), infrastructure (i.e. roads, bridges), major utilities (gas, electric, water, sewer), debris removal, and medical treatment.

The Commonwealth has initiated the process of developing this capability. However, additional staff and funding are needed to support the establishment of this capability in a timely fashion. State and local representatives must match up with federal personnel to form rapid needs assessment teams. Personnel in specific disciplines must be identified and trained to staff these teams. Plans and procedures must also be developed to ensure prompt and effective deployment of the teams to the disaster area immediately following the event. Where disaster warning is possible, such as with a hurricane, prepositioning of assessment teams must be done.

RECOMMENDATION

- **Continue to develop the capability to assess damages following a disaster in a more prompt, effective, and efficient manner by establishing rapid assessment teams that are properly equipped and trained for this function. Provide additional staff and funding to support development of the required planning and training effort on an accelerated basis.**

Regional Field Offices

The Virginia Department of Emergency Services maintains three regional offices to serve the Commonwealth's 139 political subdivisions that are a part of its emergency management system. Each regional office is staffed by a regional coordinator, who assists the jurisdictions in developing, maintaining, and enhancing their disaster preparedness programs.

ASSESSMENT OF REGIONAL FIELD OFFICES

The regions as they currently exist are too large and unwieldy to develop any meaningful programs in the areas of regional planning, training, or resource support. In order to effectively enhance regional capabilities in these areas, the regions must be reduced to more manageable areas that are better aligned in terms of the hazards that exist in the area, resources available, and other socio-economic factors. (See Appendix F). Throughout the mid-sixties and the 1970s, the Department maintained four regions and six coordinators. Over the years, budget cuts have eroded this function to its present number.

RECOMMENDATIONS

- **Restructure regional organization to six regional offices (from the current three) that are more manageable in terms of area served, and better aligned in terms of the hazards that exist, resources available, and other socio-economic factors.**

- **Augment regional staff to include a planner and a trainer to support local and regional emergency management preparedness.**

Mutual Aid

The State Emergency Operations Plan encourages local directors of Emergency Services to develop formal mutual aid agreements with adjacent political subdivisions. There is no actual requirement for such agreements. Many of the mutual aid agreements that do exist among political subdivisions in the state are verbal rather than written, and cross jurisdictional response is often ad hoc and sometimes not well coordinated.

When a major incident or disaster occurs in a political subdivision that quickly overwhelms the jurisdiction's response capabilities, it may call the state directly for assistance. The state is a one-stop center involving a telephone call from the locality to the Regional Coordinator or in larger events to the State Emergency Operations Center. The state's response system allows the Department of Emergency Services to tap the capabilities of all state agencies and the federal government, as provided for in the State Emergency Operations Plan. In most major disasters that have occurred in the Commonwealth, state and federal assets have been sufficient to address the situation. However, catastrophic disasters demand a more structured organization to facilitate the flow of assets into the impacted area.

ASSESSMENT OF MUTUAL AID

Mutual aid among jurisdictions, as well as between states, can speed the delivery of certain types of assistance. However, in order to be effective and dependable, these mutual aid agreements should be formalized.

To ensure that adequate resources from other states will be readily available to effectively respond to and recover from a catastrophic disaster, Virginia developed, under the auspices of the Southern Governors Association, a mutual aid compact among all nineteen member states that comprise the Association. This agreement, which is the only one of it's kind in the country at this time, provides the framework under which mutual aid will be requested, received, and utilized in times of disaster. Supplementary support agreements and procedures will be developed by member states to facilitate the implementation of the agreement once it is enacted. This process will begin with those states that are contiguous to the Commonwealth of Virginia. The Department of Emergency Services has already been in contact with the states of North Carolina, Maryland, and Tennessee in this regard.

In a catastrophic event, it will also be necessary to establish a mechanism to identify and mobilize local resources outside of the impacted region and channel them to the disaster area. However, before such a system can be implemented regionally and statewide, many questions regarding such things as liability, insurance, methods of payment, responsibilities, and who has control of these assets in the response, must be addressed.

With the exception of the hazardous materials program, there is no system in place that would mobilize local resources and assistance on a regional basis, before activating state resources or in conjunction with the activation of state resources.

In a disaster of catastrophic proportions, such a system, if properly developed, would have the capability to provide disaster aid in a prompt, organized, and effective manner, prior to, during the event, and particularly in those critical hours and days immediately following the disaster's occurrence (See Appendix G).

RECOMMENDATION

- **Initiate the process to formalize and develop a statewide mutual aid system to provide a framework to more effectively organize, mobilize, and deploy local resources and assistance to the disaster area.**

Disaster Assistance

The Grants Administration Division manages the federal public and individual assistance programs following a Presidentially declared disaster. The Disaster Public Assistance Program provides emergency and long range disaster recovery financial assistance to state and local governments, as well as private non-profit organizations. The Individual Assistance Program provides assistance to individuals to meet critical and immediate needs. The Division also administers the Individual and Family Grant Program after a Presidential Disaster Declaration. These federal programs are financed by matching federal, state, and local funds.

ASSESSMENT OF DISASTER ASSISTANCE

There is nothing in Virginia's history that compares to the level of devastation caused by a catastrophic disaster such as Hurricane Andrew. The level of assistance provided in Virginia's disasters pales in comparison to the assistance that would be required following a catastrophic event. (See Appendix H). These programs are currently minimally staffed. A reservist program is recommended to allow for prompt and pre-trained augmentation.

RECOMMENDATION

- **Provide an adequate budget to fund current personal and non-personal services relating to disaster assistance, as well as a reservist program to supplement present full-time staff in major or catastrophic disasters.**

FUNDING

Improvements to the Commonwealth's emergency management system over the past two decades have brought it, with two major exceptions, to an adequate level of preparedness for the type of emergencies/disasters we have experienced in recent years. The exceptions are the inadequacy of the State Emergency Operations Center and the state Emergency Communications Center. These items are discussed elsewhere in this report. However, unless additional support is made available, the state's ability to keep pace with growing emergency management demands will decline and the systems ability to deal with a catastrophic event will remain seriously inadequate.

Federal, state, and local funding sources that support the various components of the Commonwealth's emergency management system have either been reduced, eliminated, or remained the same, while the state's vulnerability to a broad range of hazards has grown consistently greater each year. Funding levels that have remained the same as previous years equate to a reduction in funding, as program needs and costs continue to increase. This increase in vulnerability is caused by continuing growth and development in the state's major population centers, particularly in the Hampton Roads area that is susceptible to the hurricane threat.

The scope of the funding problem has reached a critical juncture on the state level, as federal funds, which have remained relatively flat for several years in most program areas, are projected to be reduced or eliminated in Federal Fiscal Year 1995. Historically, the federal government has contributed heavily to state/local emergency preparedness because of the nuclear attack threat. With the demise of the Soviet Union and the corresponding reduction of the nuclear attack threat, Washington is looking for ways to cut spending and emergency preparedness (civil defense) is a likely target. Four 100% federally funded state programs have already been targeted. In FFY 1995, one program is projected to be eliminated and three others will require matching funds.

This situation is exacerbated by the fact that emergency management programs that are 100-percent state funded have also experienced significant reductions over the past few years. The extent of these reductions vary from program to program. For example, in Fiscal Year 1992-1993, the Chemical Emergency Preparedness Branch, which is 100 percent state funded, sustained about a fifty percent funding reduction, while its program responsibilities remained the same. State training funds have also been reduced in recent years. The Commonwealth's Search and Rescue training program is also supported by state funds. Between 1990 and 1992, funds used for search and rescue training were reduced 79 percent.

In the case of the Virginia Hazardous Materials Emergency Response Program, state funding support was reduced approximately 20 percent. This does not include the anticipated state and federal funding reductions in the 1994-1996 biennium. Field offices that serve local governments were reduced from four to three offices in 1992 due to decreases in state funding. The warning and communication section of the Virginia Emergency Operations Center has also had to absorb reductions in their state funding over the past few years.

As these examples illustrate, state and federal funding reductions have not only been wide ranging in scope, but have impacted upon many key functional areas of the Commonwealth's emergency management system. The necessary system and facility upgrades, equipment purchases, and support programs to sustain an optimum level of preparedness have either been delayed, canceled, or phased in incrementally due to budget constraints at all levels of government.

The Commonwealth and its political subdivisions have been able to circumvent many of the system shortfalls identified in this report due to the nature, scope, or location of previous disasters. Unfortunately, this

success may have projected the illusion of a greater level of preparedness than actually exists, and to some extent, this creates a false sense of security. The deficiencies in the system would become glaring in a catastrophic disaster, especially if it occurred in a very populated and developed part of the state. Where a small or medium disaster may point out cracks in the armor, these same cracks may prove to be major breaches, resulting in lives lost and assistance undelivered in a major or catastrophic disaster.

The Commonwealth of Virginia and its political subdivisions must develop a level of preparedness and operational capability that will allow them to effectively respond to and recover from both major and catastrophic disasters. The current and projected levels of local, state, and federal funding are insufficient to address the shortfalls identified in this report.

RECOMMENDATIONS

- **Establish an Emergency Management Preparedness and Assistance Trust Fund, supported by a dedicated funding source, to be administered by the Virginia Department of Emergency Services, for the purpose of supporting state and local emergency services preparedness programs.**

- **Create a Hazardous Materials Administration Trust Fund, capitalized by a fee system imposed on the chemical user community, for the purpose of supporting hazardous material preparedness programs and initiatives.**

DISCUSSION

Emergency Management Preparedness and Assistance Trust Fund

Although the revenue source to support the recommended trust fund will be determined by the General Assembly if approved, it is recommended that the funding source selected have a logical relationship to the purpose of the trust fund.

One possible option to capitalize the trust fund would be to impose an annual surcharge on homeowners and commercial insurance policies, to provide a dedicated source of revenue to support various aspects of the state and local emergency management system. This approach was recently implemented by the Florida legislature in the spring of 1993, which placed a surcharge on homeowners and commercial insurance policies of $2 and $4, respectively. In Virginia, the funding mechanism would probably incorporate a percentage surcharge rather than a dollar surcharge. The precedent for a dedicated funding source to support critical state and local emergency programs has been established in the Commonwealth with the Fire Programs Fund (Section 38.2-

401 of the Code of Virginia) and the "Two for Life" program (Section 46.2-694 of the Code of Virginia). Revenues generated from the dedicated funding source if adequate, could enable the Department of Emergency Services to become a special fund/federally supported agency, as far as emergency management is concerned.

The planning, training, and infrastructure improvements developed with this funding will enhance emergency response and recovery capabilities, thereby lessening the liability exposure and losses by the insurance industry. Once the funds have been collected, it is recommended that they be distributed to support state and local emergency management initiatives. In Virginia, the estimated need to provide an adequate ongoing program is approximately $8 million. Note that this does not include funding for hazardous material programs or for capital outlay projects, such as the EOC and communications enhancements. By example, this equates roughly to what is currently being generated to support the Fire Programs Fund, described under Section 38.2-401 of the Code of Virginia, using a percentile assessment levied against selected insurance policies. The recommended allocation could be patterned somewhat after the state of Florida law which is as follows:

- Sixty percent of the funds collected be allocated to implement and administer state and local emergency management programs. Eighty percent of this sixty percent be allocated to local emergency management agencies and programs. Twenty percent will be allocated to the state emergency management agency.

- Fifty percent of the remaining forty percent be dedicated to state relief assistance for nonfederally declared disasters, to include but not be limited to, grants and below-interest-rate loans to businesses for uninsured losses resulting from a disaster.

- The other fifty percent of the forty percent will be used for grants and loans to state or regional agencies, local governments, and private organizations that will achieve state and local emergency management objectives. The type of projects funded under this program could include such things as public education on disaster preparedness and recovery issues, the development of training programs to improve the operational capabilities of agencies assigned lead or support responsibilities under the state comprehensive emergency management plan, etc.

The Florida law requires that at a minimum, a local emergency management agency either have a program director who works at least 40 hours a week; or in jurisdictions that have fewer than 50,000 population, have a program director who works at least 20 hours per week.

If this funding mechanism is approved by the General Assembly, it is anticipated that it will take approximately one year to develop and implement the necessary legislation to enact the program. It will take another year to establish the organizational framework and procedures to collect and disperse the funds.

Some of the program initiatives recommended in this study, particularly the capital intensive ones, will begin being implemented three to five years after the legislation is passed. The recommendations that do not require major funding will begin being phased in immediately.

Hazardous Material Trust Fund

Although all jurisdictions are required by state law and SARA Title III, to develop and support hazardous materials preparedness programs, minimal funding support is provided. Almost fifty percent of the states have developed and implemented a fee system to support their hazardous material preparedness program in an effort to enhance overall state and local response capabilities. Many chemical companies located in Virginia have facilities in other states and are already paying these fees.

Such a fee system would create a stable source of non-general fund funding that would support both state and local programs. The Department of Emergency Services currently administers a statewide haz-mat emergency response program as described in Appendix E.

The Commonwealth of Pennsylvania's Hazardous Material Emergency Planning and Response Act (Act 165) established a county level fee and a state level fee on chemical facilities. Under the county fund, facilities pay an annual fee of between $35 and $75 (as determined by county ordinance) for each chemical reported on the Tier II report. Additionally, up to $100 (exact amount is set by county ordinance) is paid annually by each facility required to prepare an emergency response plan.[6]

The Pennsylvania Hazardous Material Response Fund (HMRF) is a restricted revenue account used to administer emergency planning/response and data collection/dissemination functions at the state and county levels. The fund consists of an annual $10 fee for each chemical on the Tier II reports. A registration fee of $1,000 was paid the first year (1990) by facilities filing a toxic chemical release inventory (TRI) report for calendar year 1989. For the 1990 report year and subsequent years the fee is $250 per TRI chemical, with a cap of $5,000 per facility.[7] Under this program in Fiscal Year 1992, $2,346,000 was released to the state and $1,269,500 to the counties to carry out the purpose, goals, and objectives of Act 165.[8]

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[6] Emergency Planning and Community Right to Know Act: A Status of State Actions-1992, National Governors' Association, Washington, D.C.:1993, Page 88

[7] Ibid, Page 88

[8] Hazardous Material Emergency Planning and Response Act 1990-165, Annual Report 1991-1992, Pennsylvania Emergency Management Council, Page ii

SUMMARY OF RECOMMENDATIONS

FUNDING

- Establish an Emergency Management Preparedness and Assistance Trust Fund, supported by a dedicated funding source, to be administered by the Virginia Department of Emergency Services, for the purpose of supporting state and local emergency services preparedness programs. The Florida legislation discussed in the funding section of this report is a good model, but would probably require modification to reflect a percentage surcharge rather than a dollar surcharge.

- Create a Hazardous Materials Administration Trust Fund, capitalized by a fee system imposed on the chemical user community, for the purpose of supporting hazardous material preparedness programs and initiatives.

FACILITIES AND DATA SYSTEMS

- Construct a new Emergency Operations Center to enhance the overall efficiency of emergency operations in a disaster, as well as provide the necessary space for all key agencies.

- Develop the necessary critical systems at the Emergency Operations Center that will accommodate the anticipated volume of information that will be generated and processed during the course of a major or catastrophic disaster.

- Expand the Virginia Emergency Operations Center Local Area Network to include other key state agencies.

- Study the feasibility of developing a Geographic Information System (GIS) designed to serve the emergency management needs of the Commonwealth, have the capability to interface with other systems, and is reasonable in cost.

- Replace the current Emergency Services mobile command post vehicle with a new 40-foot diesel-powered mobile command post vehicle, properly equipped and designed to meet state and local emergency services needs.

COMMUNICATIONS AND WARNING SYSTEMS

- Enhance the Virginia Criminal Information Network system, the primary warning system between state and local governments, to integrate National Weather Service information into a statewide enforcement/emergency management network. This eliminates the need to retype and reformat data, and speeds the transmission of warning information. This process should still be coordinated through the Virginia EOC.

- Expand and upgrade the Virginia Warning System to a survivable system with additional warning points in order to allow more localities and state response agencies access to instant voice communication.

- Encourage the use of the Telecommunications Service Priority System for critical local and state circuits. This service priority system allows critical communication circuits to be identified and repaired quickly in a disaster situation. In addition to this, the effective strategies of diversity routing and site hardening of all telecommunications services should be implemented on a routine basis.

- Promote and support state agency and local government participation in the State Emergency Communications Using Radio Effectively (Operation SECURE) program. This is a high-frequency, single side band system used for intrastate as well as interstate coordination when telephone lines are not functioning.

- Develop and provide funding assistance to communications systems that service regional needs while allowing for emergency access by state response agencies, as needed.

- Create, implement, and support a statewide Emergency Management Communications System that links local jurisdictions, state response agencies, and federal installations and has the capability to transmit data. The Virginia State Police digital microwave system or a satellite system could serve as the basis for such a system.

- Install mutual aid channels that are provided for by the Federal Communications Commission under the National Public Safety Plan.

PLANNING

- Provide additional technical assistance to state agencies in the development of the necessary plans, subplans, and standard operating procedures and programs to support the State Emergency Operations Plan.

- Broaden the scope of local planning initiatives to include regional and interregional provisions. Plans that are very strong locally may not be regionally. In a catastrophic disaster, issues such as evacuation, sheltering, resource deployment, and alternate operational facilities are regional and statewide in scope. Local planning and training programs have a tendency to focus primarily within jurisdictional borders.

- Develop a more consistent, integrated, and coordinated program of assistance to local governments in the various emergency planning program areas. The level of assistance now provided differs between program areas due to the varying levels of funding and resource support provided. For example, the capabilities of the Radiological Emergency Response Program in planning, training, and

resource support are significantly greater than that of the Chemical Emergency Preparedness Program.

STAFFING

- Develop and support an appropriate level of emergency management staffing to establish and maintain an acceptable local and state level of preparedness. Contingent upon the availability of adequate funding support, every jurisdiction with a population of 25,000 or greater, should have at a minimum a full-time emergency services coordinator. Specific state emergency services staff needs are discussed in the text.

TRAINING

- Design a comprehensive, integrated, and continuous training program that is specifically tailored to the needs of department personnel, state agencies, local governments, and volunteer support groups. Training programs in the past have relied heavily on FEMA's curriculum and program requirements, rather than state developed training tailored around local, regional, and state needs.

- Develop detailed training manuals and operational guidelines to fulfill expedient training needs as well as programmatic needs. In catastrophic disasters, staff requirements will be significantly greater than in most disasters Virginia has experienced in recent history. This situation will require innovative training programs that are quick, comprehensive, and effective in communicating the basic requirements of the task at hand to the augmented staff.

- Develop a cadre of qualified local instructors for many more basic and advanced training programs.

- Establish a multi-disciplinary training facility designed to serve and support the various disciplines that comprise emergency services.

DONATED COMMODITIES AND VOLUNTEER SERVICES

- Continue to identify, develop, and coordinate the necessary resources, systems, and personnel to implement the Commonwealth's donations management plan, as well as manage volunteer services effectively and efficiently. Some level of financial support should be provided to purchase the necessary hardware and software to support these functions.

EVACUATION AND SHELTER

- Enhance the coordination of evacuation and shelter plans locally, as well as regionally, in order to better serve the needs of the risk population and ensure the success of these critical operations.

- Develop and implement more comprehensive shelter management training programs tailored to the needs of local governments.

HAZARDOUS MATERIALS RESPONSE AND TRAINING

- Develop a dedicated funding source for hazardous materials preparedness and response programs to meet the increasing demands in this area and maintain an appropriate level of readiness (Also noted under the funding recommendations).

SEARCH AND RESCUE

- Provide adequate and stable funding to develop, promote, and sustain Virginia's growing search and rescue responsibilities and initiatives so that this predominately volunteer force can be properly trained.

PUBLIC INFORMATION/PUBLIC EDUCATION

- Provide the necessary staff and financial resources to support the increasing demands placed on the emergency public information office, especially in the family protection program area, and in emergency public information training for local government personnel.

NEEDS/DAMAGE ASSESSMENT

- Continue to develop a capability to assess needs/damages following a catastrophic disaster in a more prompt, effective, and efficient manner by establishing rapid assessment teams that are properly equipped and trained for this function. Provide additional staff and funding to support development of the required planning and training effort on an accelerated basis.

REGIONAL FIELD OFFICES

- Restructure regional organization to six regional offices (from the current three) that are more manageable in terms of area served and better aligned in terms of the hazards that exist, resources available, and other socio-economic factors.

- Augment regional staff to include a planner and a trainer to support local and regional emergency management preparedness.

MUTUAL AID

- Initiate the process to formalize and develop a statewide mutual aid system to provide a framework to more effectively organize, mobilize, and deploy resources and assistance to the disaster area.

DISASTER ASSISTANCE

- Provide an adequate budget to fund current personal and non-personal services relating to disaster assistance, as well as develop and maintain a reservist program to supplement present full-time staff in major or catastrophic disasters.

APPENDIX A

ORGANIZATIONAL OVERVIEW
VIRGINIA DEPARTMENT OF EMERGENCY SERVICES

The Virginia Department of Emergency Services (VDES) is the State Coordinating Agency for the Commonwealth. It is responsible for coordinating the state's prompt and effective response to disasters; providing technical assistance to state agencies and local governments in developing the necessary plans, programs, and policies to support the response and recovery effort; the administration of federal financial assistance for emergency preparedness, and state and federal disaster recovery and assistance programs.

In order to more effectively fulfill its responsibilities to state agencies and local governments and enhance its coordination capabilities in a disaster, the Virginia Department of Emergency Services is organized functionally into five divisions. These divisions include Operations, Plans, Technological Hazards, Grants Administration, and Support. An overview of the various division program responsibilities is provided below.

Operations Division

The Operations Division is responsible for coordinating state response, emergency relief and recovery activities in emergency and disaster situations that occur within the Commonwealth. The responsibilities of the Operations Division are many and varied and are briefly summarized below.

MAINTAINING THE EMERGENCY OPERATIONS CENTER

The Operations Division of the Virginia Department of Emergency Services is responsible for equipping, staffing, and managing the State Emergency Operations Center (EOC) 24 hours a day, seven days a week. This facility provides a central location where state and federal and volunteer personnel can come together to coordinate and manage disaster response and recovery operations. The State EOC, which was constructed in 1951, is located below the State Police Training Academy on Midlothian Turnpike in Richmond, and has approximately 4,700 square feet of working space. The present size of the Virginia EOC is approximately 58,000 square feet short of the space recommended in an October 1988 architectural study.

COMMUNICATIONS AND WARNING

The State EOC includes an integrated and diverse warning and communications system that provides the Virginia Department of Emergency Services with the capability to alert, notify, and provide guidance to state agencies, local governments, and the general public regarding a pending hazard, as well as direct and control emergency operations prior to, during, and following the disaster.

TRAINING AND EXERCISING

The Virginia Department of Emergency Services is responsible for the development, administration, and maintenance of a comprehensive training and exercise program that is principally based upon an emergency management curriculum developed by FEMA. The program is comprised of a general core, functionally specific, as well as a variety of on-going refresher training programs designed to attain and sustain an acceptable level of emergency preparedness for state agencies, local governments, quasi-public and volunteer groups who participate in the training.

A major component of the training program is the development, planning, and implementation of a variety of functional and full-scale exercises on a local, regional, and statewide basis annually. These exercises and drills are designed not only to test the plans, subplans, and procedures developed, but also to train all appropriate officials, emergency response personnel, government employees, industry, and the general public, for the purpose of enhancing the overall emergency disaster response and recovery operation.

Technical assistance is also provided, as requested, to state agencies, local governments, and quasi-public entities in developing, conducting, and evaluating emergency management training programs and exercises.

The Commonwealth also participates in federal exercises for additional training, as well as to improve the coordination and interface with federal agencies who will be assisting the state in a disaster.

SEARCH AND RESCUE

The Emergency Operations Center (EOC), which is also designated as the state's Rescue Coordination Center, has a Search and Rescue Duty Officer on call 24 hours a day to serve the state's search and rescue needs in the event of an incident.

The Search and Rescue program in Virginia is eclectic in nature in that it draws upon the resources and expertise of a variety of groups such as volunteer canine teams, Civil Air Patrol, Appalachian Search and Rescue, and the Virginia National Guard, with the Virginia Department of Emergency Services serving as the coordinating agency. All of the major search and rescue groups in the state have executed a formal memorandum of understanding with the Commonwealth of Virginia that defines their role and responsibilities in a search and rescue incident coordinated by the state.

The Department of Emergency Services is the primary provider of training, including course development, to the volunteer SAR community that constitutes the bulk of this invaluable resource.

Technological Hazards Division

The Technological Hazards Division of the Virginia Department of Emergency Services is responsible for developing, administering, and implementing the Virginia Hazardous Materials Emergency Response Program, which was

established by the General Assembly in 1987 by passage of HB 1172. The law also created the State Hazardous Materials Emergency Response Advisory Council to assist the State Coordinator of Emergency Services with program development and implementation.

In establishing the program, the Technological Hazards Division had to assess the hazardous materials response needs of each political subdivision, develop a regional program that addressed the needs identified, and define the various program requirements that had to be fulfilled by participating jurisdictions in order to make it a viable program. In developing the 13 locally based hazardous materials regional response teams, the Department entered into agreements with twenty jurisdictions that participate in the program. The Department also coordinates the development, administration, and provision of a standardized hazardous materials training program for the Commonwealth that trains the response teams, as well as the first responders in a variety of disciplines.

Plans Division

The Plans Division of the Virginia Department of Emergency Services develops, maintains, and updates state and local level Emergency Operations Plans (EOPs) in cooperation with federal, state, and local officials, quasi-public agencies, and volunteer groups, to ensure an effective response and recovery effort, as well as the timely provision of emergency relief in the event of a disaster. Plans also provide a written basis for preparedness activities such as training and exercises. The Plans Division is comprised of four branches that identify the necessary resources and develop the appropriate protective actions for a variety of natural and man-made hazards that confront the Commonwealth. These branches are Local Planning Assistance, Radiological Emergency Response Planning, Special Projects, and Chemical Emergency Preparedness.

Grants Administration

The Grants Administration Division is responsible for the oversight and coordination of the Comprehensive Cooperative Agreement (CCA) between the Federal Emergency Management Agency and the Commonwealth of Virginia. This includes administering federal grants for emergency management assistance and other activities. The CCA provides financial and technical assistance for emergency management activities for the state and its local governments.

The Grants Administration Division also manages the Disaster Public Assistance Program. This program provides emergency and long-range disaster recovery financial assistance to state and local governments, as well as private nonprofit organizations. Another component of this Division is the Emergency Management Assistance program. This program provides federal financial assistance to local governments and the Department of Emergency Services for emergency management personnel salaries and benefits, not to exceed one-half of eligible and necessary expenses.

Support

Sound financial management practices carried out in an expeditious manner are critical to the success of response and recovery operations during a disaster. The Support Division is responsible for developing and implementing the necessary financial management controls and accounting practices, in accordance with the appropriate budget authorities for state agencies and local governments. These measures are necessary to ensure that actions taken and costs incurred during emergency operations are justified and consistent with state and federal disaster plans, regulations, and laws.

The Support Division collects, reviews, and maintains all financial records and supporting documents relating to staff, resource, and service expenditures by state agencies and local governments during all phases of disaster operations. Detailed, accurate, and timely financial records are vital in justifying, as well as maximizing, state and local claims for federal financial assistance. In addition, this Division administers the daily fiscal, payroll, and purchasing activities of the Department.

During periods of disaster response and recovery, this Division, with assistance from other designated state and federal agencies, is responsible for the resources support emergency function. This includes arrangements for any and all resources, goods, and services required by all the other emergency support function areas. It also includes the acquisition of resources to maintain the state EOC and the individuals required to be relocated to the EOC or to a Disaster Field Office (e.g. transportation, food, lodging, equipment, maintenance, etc.). Mechanisms to fund disaster costs are also arranged with appropriate state and federal officials.

General Administration

General administration of the Department includes the offices of the State Coordinator and Deputy Coordinator, Human Resources, Public Information, Field Services, and Environmental Remediation which is responsible for managing the cleanup of the Commonwealth of Virginia's Emergency Fuel Storage Facility at Cheatem Annex. Since the offices of Public Information and Field Services have a functional support role in disasters, their responsibilities are summarized below.

PUBLIC INFORMATION OFFICE

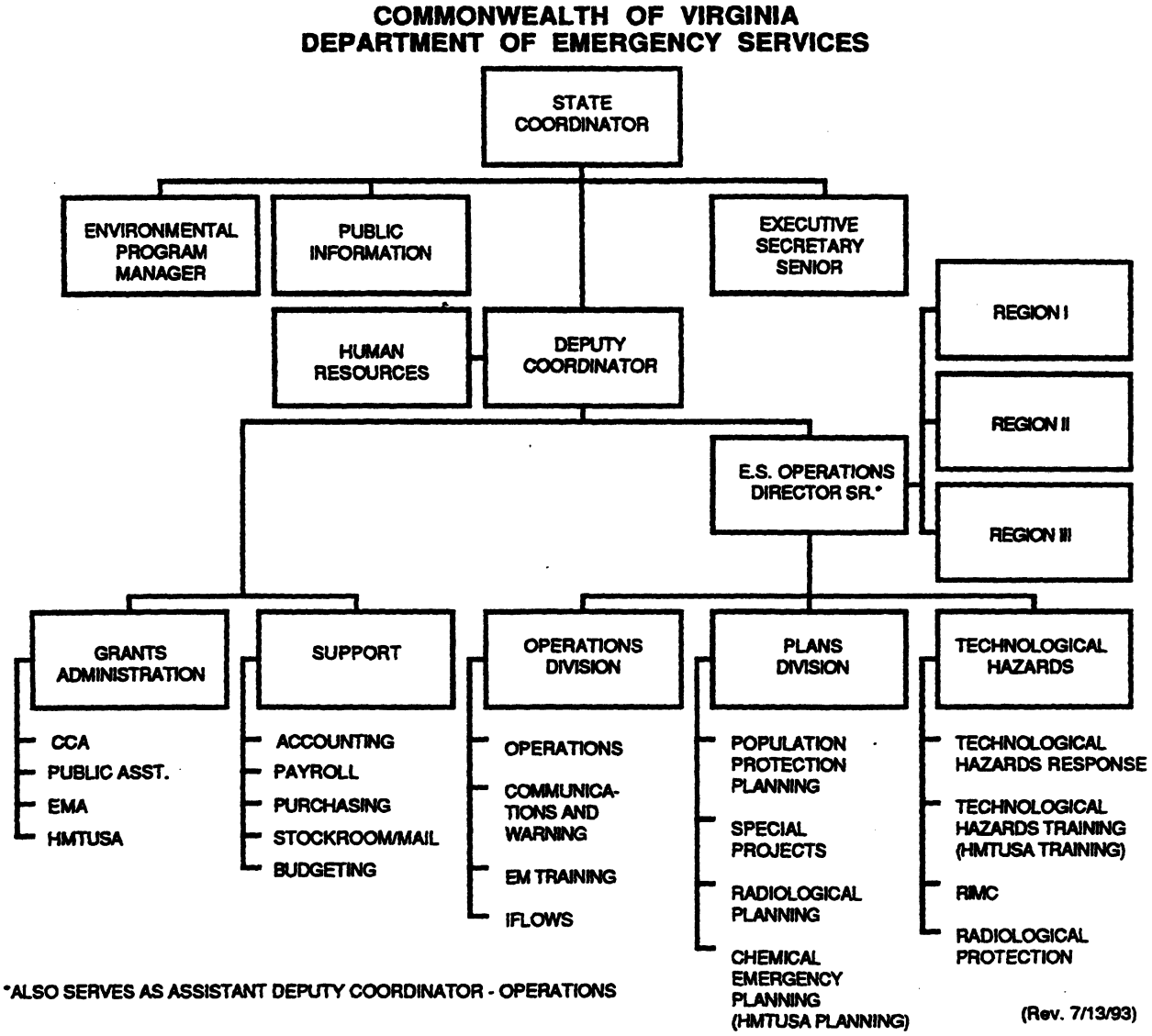
The Public Information Office of the Virginia Department of Emergency Services is responsible for developing plans and procedures to effectively communicate with the general population, the population at risk, and the media in a timely, accurate, and consistent manner during emergency and non-emergency times. This includes Emergency Public Information training and related programs.

OPERATIONS MANAGEMENT AND FIELD SERVICES (OMFS)

The management element of OMFS provides direction and coordination for administering programmatic and response activities of the Planning, Operations, and Technological Hazards Divisions, as well as for Field Services.

Field Services staff provides guidance and assistance to local governments in the development and implementation of emergency response plans and programs. This unit provides liaison and direct support to local emergency management in meeting programmatic requirements to secure federal financial assistance and in responding to emergencies and disasters. The Field Services unit also has responsibility in monitoring the delivery of federal financial assistance to localities.

In order to serve the needs of the Commonwealth's 139 political subdivisions, the agency currently maintains three regional offices. Each regional office is staffed by a regional coordinator who assists the jurisdictions in developing, maintaining, and enhancing their disaster preparedness programs.


COMMONWEALTH OF VIRGINIA
DEPARTMENT OF EMERGENCY SERVICES
STATE COORDINATOR
ENVIRONMENTAL PROGRAM MANAGER
PUBLIC INFORMATION
EXECUTIVE SECRETARY SENIOR
HUMAN RESOURCES
DEPUTY COORDINATOR
REGION I
REGION II
REGION III
E.S. OPERATIONS DIRECTOR SR.*
GRANTS ADMINISTRATION
SUPPORT
OPERATIONS DIVISION
PLANS DIVISION
TECHNOLOGICAL HAZARDS
CCA
PUBLIC ASST.
EMA
HMTUSA
ACCOUNTING
PAYROLL
PURCHASING
STOCKROOM/MAIL
BUDGETING
OPERATIONS
COMMUNICA-TIONS AND WARNING
EM TRAINING
IFLOWS
POPULATION PROTECTION PLANNING
SPECIAL PROJECTS
RADIOLOGICAL PLANNING
CHEMICAL EMERGENCY PLANNING (HMTUSA PLANNING)
TECHNOLOGICAL HAZARDS RESPONSE
TECHNOLOGICAL HAZARDS TRAINING (HMTUSA TRAINING)
RIMC
RADIOLOGICAL PROTECTION
*ALSO SERVES AS ASSISTANT DEPUTY COORDINATOR - OPERATIONS
(Rev. 7/13/93)

APPENDIX B

ASSESSMENT OF THE VIRGINIA EMERGENCY OPERATIONS CENTER AND DATA SUPPORT SYSTEMS

The Emergency Operations Center (EOC) recently underwent a limited renovation that involved the removal of walls to make more efficient use of existing space. The modifications will allow the Emergency Operations Center to accommodate representatives from approximately 8 of the potential 49 state agencies that are subject to be called upon in the event of a disaster. Prior to the renovations, the EOC could only accommodate representatives from five state agencies. Also, the new floor configuration enhances state agency staff interaction and coordination, as agency representatives are no longer segregated in separate rooms, but are collocated in an open area.

However, the Commonwealth's Emergency Operations Center is still lacking adequate space and the necessary amenities to accommodate the anticipated number of key government officials and minimum support staff (25 state and 14 federal agencies) who will be located there to coordinate state response and recovery operations during a disaster.

The space constraints of the Emergency Operations Center also prevent the necessary stocking of food, water, medical, bedding, sanitation, and welfare supplies to satisfy the needs of staff members assigned there for any extended period of time.

The EOC still has less than desirable accommodations to display status boards, maps, and other graphic media due to the columns, ductwork, and low ceilings that currently exist there. Although anticipated computer enhancements may alleviate some of these problems, the characteristics of the facility are such that they prohibit it from ever functioning in an optimum manner.

Functional activities within the Commonwealth's Emergency Operations Center will still be fragmented to a great extent during disaster operations, as many of the state agency support staff will have to be located elsewhere due to the space limitations. The EOC renovations only allow space for one state and federal representative to be stationed at each of the 17 functional workstations established.

The Advance Element of the Federal Emergency Response Team (ERT-A), which is described more fully under the Federal Response Plan on page 26, will be stationed initially at the Virginia Emergency Operations Center for a period of 3-10 days before being deployed to the Disaster Field Office. This advance element will consist of approximately 60-80 people, as well as the support equipment to carry out their disaster operation responsibilities. It is projected that state agency representatives and support staff will also total approximately 60-100 people, bringing the entire number of staff stationed at the EOC to between 120-180 people. Space must also be provided for their equipment as well. The facility space requirements for these people and equipment are significant and would require additional facilities.

SHORT-TERM PLAN TO ACCOMMODATE EXPANDED OPERATIONS

In order to satisfy the space requirements of emergency operations staff during a disaster in the short term, the Virginia Department of Emergency Services has executed an agreement with the Virginia State Police Training Academy, located above the EOC, to provide additional space. This facility can be accessed through an internal stairwell leading directly from the EOC to the training academy.

PLAN REQUIREMENTS AND SHORTFALLS

This cooperative arrangement between the Virginia State Police Training Academy and the Virginia Department of Emergency Services is a temporary solution to a very serious facility problem for the following reasons:

Limited Access

The facility belongs to the state police and would only be available to augment existing Emergency Operations Center space in a catastrophic disaster. This would preclude or severely limit the possibility of conducting periodic training at this site to identify potential organizational or operational problems.

Fragmented Operations

Current space in the Emergency Operations Center will only allow 17 work stations. Additional work stations will have to be established in the Virginia State Police gym and training academy. This arrangement will inhibit efficient communication and compromise the coordination capabilities between the participating disaster groups.

Infrastructure Needs

Considerable equipment, manpower, and time will be required to quickly convert the academy facilities to serve as extended operational areas in support of the Emergency Operations Center. In order for this to occur in an expeditious manner, the basic infrastructure to support the anticipated computer and telephone equipment that will be based at these facilities must be in place prior to the time the disaster takes place. Equipment needs must be clearly identified for each satellite site in order to develop the necessary infrastructure to support these systems.

The Virginia State Police Training Academy facilities are not equipped at this time to support either the computer or communications equipment expected to be located at these sites. To support the computer equipment at these satellite facilities, an IBM token ring cable network will have to be installed at each satellite facility. The equipment will be linked to the EOC either through a modem or direct cable.

If linked by modem, a dedicated telephone line would have to be established between sites for each connection. This approach may compromise the flow of

critical information between sites if there are only a limited number of dedicated lines established.

Providing a direct cable link between sites to accommodate all equipment operating from these satellite facilities would be a more efficient approach. This will require installing the necessary cable line between the pre-selected satellite offices at this time.

The communication requirements for these facilities must also be identified. Once the communication requirements have been determined, the necessary telephone lines should be extended to these pre-selected sites to accommodate these needs. It must be emphasized that although the trunk line to support the additional communication equipment will be in place, the actual lines to the work stations will not be run until the decision to utilize the Virginia State Police Training Academy gym is made. It is anticipated that these lines can be established within 12-24 hours following the decision being made to occupy these facilities.

Equipment Interoperability

Interoperability refers to a system's ability to exchange information with other systems. It is anticipated that many of the state, federal, quasi-public organizations, and volunteer groups who will be operating at these satellite facilities will bring their own computer equipment and software to conduct their functional responsibilities. This equipment will not have the capability to access the Emergency Operations Center data bank unless they have the network software and a network compatible interface board. This will require a great deal of pre-planning and coordination between the state coordinating agency and the state and federal support agencies.

Equipment Security

During emergency operations, there will be much demand to access the Emergency Operations data bank from a variety of sources. A security system must be in place to prevent any unauthorized access to or use of the data bank. Accounts will have to be established for those agencies that will clearly have a need to access the system.

Equipment Storage, Maintenance and Testing

Most of the equipment required to support emergency operations will have to be stored on site to ensure a prompt conversion of these facilities to emergency operational areas. Storage of equipment will make regular maintenance and testing of equipment very difficult. Equipment that is set up and used on a regular basis tends to be more reliable, as it can be maintained and tested on a regular basis.

Adequacy of Space

There is still some question as to whether these facilities are large enough to accommodate the level of staffing and equipment required to support emergency operations in a catastrophic disaster.

Data Systems Required

In a disaster of catastrophic proportions, the Virginia Emergency Operations Center must have the capability to receive, process, and disseminate voluminous amounts of information in a timely manner. Accurate and timely data received by the Emergency Operations Center is essential in developing and implementing effective actions and strategies in the mitigation of, response to, and recovery from the effects of a disaster. Data will be received on a continuous basis prior to, during, and following the disaster from a variety of sources (i.e., local governments, state agencies, federal government, news media, citizens, volunteer groups, etc.). Upon receiving the information, the Emergency Operations Center will evaluate it in terms of accuracy, timeliness, and relevancy to emergency response operations. Once the information is evaluated and verified, it can then be developed, organized, and disseminated for use through a variety of media to include maps, charts, reports, status boards, etc.

In order to accomplish this, the Emergency Operations Center must have a data system in place capable of handling the volumes of information generated during the course of the disaster. Such a system must easily interface with the various network points, as well as external systems, and allow for the free exchange of information between them. Trained staff to operate, maintain, and service the computer network must be available at all times to ensure efficient use of the equipment, as well as minimize down time of the system during emergency operations.

LOCAL AREA NETWORK

The Digital Equipment Corporation (DEC) system currently in place in the Emergency Operations Center is outmoded, difficult to use, and does not have the capability or capacity to adequately serve the needs of the EOC in a disaster situation.

The Department is in the process of upgrading and expanding to a Local Area Network within the Emergency Operations Center. Computers to serve each of the functional stations in the EOC will be purchased during the upcoming year, with the assistance of the Federal Emergency Management Agency, and will be in place and operational by the spring of 1994. The system will be designed to enhance emergency operations and effectively serve the operational demands placed on it during emergency situations. It is anticipated that the network will have the capability to accommodate approximately 256 workstations.

EXISTING GEOGRAPHIC INFORMATION (GIS) SUBSYSTEMS

The EOC currently has three data base systems in place that are designed to serve very specific functions in emergency operations. They include the Emergency Information System (EIS), the Transportation Emergency Decision Support System(TEDSS), and Computer-Aided Management of Emergency Operations (CAMEO). These systems are described briefly below.

Emergency Information System (EIS)

The Emergency Information System is a comprehensive information management software package designed to support disaster operations at various levels of government for a variety of hazards. This system, like the other two described below, includes a data base and digitized base maps. Pertinent information is laid over the base maps to assist emergency management personnel in analyzing the potential impact of a disaster situation. The system does have its limitations. The base maps are static and cannot be altered or modified during emergency operations.

All of the jurisdictions around the 10-mile Emergency Planning Zones of the nuclear power stations are in the process of incorporating this software into their computer systems to enhance their disaster management capabilities. There are also a number of localities throughout the state who are either considering or who have already purchased the software.

The Emergency Operations Center will have at least three computer terminals dedicated to receiving information from other Emergency Information System sites throughout the state during an emergency.

Transportation Emergency Decision Support System (TEDSS)

This data system was developed by the Virginia Tech Center for Transportation Research for the specific purpose of determining network clearance times, as well as evaluating highway network performance, for evacuation routes around the North Anna and Surry Nuclear Power Stations during an emergency situation. The two main components of this data base include socioeconomic data for the emergency planning zones around the two nuclear power facilities and the route system that services these zones. The maps used in this system are also digitized and very basic.

Computer-Aided Management of Emergency Operations (CAMEO)

The CAMEO software package was developed by the National Oceanic and Atmospheric Administration (NOAA) to specifically assist emergency managers in addressing chemical emergencies. The system includes vector mapping which can be more detailed than the EIS system described above. However, the process time to develop the base map to be used in an emergency is very slow with vector mapping when compared to the EIS system. The CAMEO software package, like the EIS system described above, has the capability to use the Census Tiger Map Files in its data base. Because the system was developed specifically for

chemical emergencies, it would have limitations in being used for other types of emergency situations.

All three systems described above can be characterized as subsystems of an overall Geographical Information System (GIS) that has not been developed as yet. The data bases used in these systems are very limited at the present time.

The GIS data base would be significantly larger and broader than existing systems. A Geographical Information System has the capability to manipulate data in a more efficient manner and adapt it to a variety of situations. Also, the mapping features of a Geographical Information System have three-dimensional capabilities that can be manipulated to show different perspectives of the same situation.

GIS would greatly enhance the state's capabilities to more quickly and accurately assess damages in disaster situations. In a disaster situation of catastrophic proportions, the jurisdiction or region impacted will probably not have the capability to communicate or process data. Ideally, data developed specifically to assist in damage assessment, could be developed on a local as well as regional basis, and stored outside the region at an alternate site that could process the data when it was necessary to do so.

There are a number of jurisdictions, regional organizations, and state agencies who are currently developing GIS systems. However, at the present time, there is very little coordination among these groups in the development of these systems. Also, there are no minimum standards established by the state in regard to system specifications that would ensure a certain level of compatibility among the systems developed, to allow for the free exchange and processing of data.

APPENDIX C

FACILITY CHARACTERISTICS AND PROJECTED COSTS OF PROPOSED EMERGENCY OPERATIONS CENTER

Facility Characteristics

The space requirements for a new, above-ground Emergency Operations Center are currently estimated to be approximately 82,000 square feet. This space includes 25,580 square feet for administrative offices; 40,836 square feet for the Emergency Operations Center; and approximately 15,520 square feet for maintenance and storage space for the Radiological Instrument Maintenance and Calibration (RIM&C) section, the Warwick Road Repair Shop of the Technological Hazards Division, and for the communications shop to include adequate space to store and secure the Department's communications truck, mobile command post vehicle, and auxiliary equipment.

At the present time the RIM&C office is located at the Defense General Supply facility on Jefferson Davis Highway in Chesterfield County, and the Technological Hazards repair shop is located on Warwick Road in Richmond. A new facility would allow the Virginia Department of Emergency Services to consolidate these operations at a central location and eliminate the overhead costs associated with these facilities.

Projected Facility Costs

The construction costs for an above-ground facility, with an area of approximately 82,000 square feet, are estimated to be $5,425,120. The architecture and engineering costs associated with the design and construction of the facility are projected to be approximately $310,516. There will be no costs associated with land acquisition, as the Virginia State Police has offered to provide the necessary land to construct the facility at the back of their State Police Headquarters property located on Midlothian Turnpike in Chesterfield County.

Consequently, the total cost associated with the construction of a new Emergency Operations Center will be approximately $5,750,000. The current EOC would be retained as an alternate EOC to provide back-up communications and space. The table on the following page provides a summary of the facility space allocation and associated costs.

It should be noted that a new state EOC was planned as part of a consolidated Public Safety Complex projected to be developed at the state owned Elko Tract in Henrico County. Due to state budget exigencies, the project did not proceed into full design stages and construction. It appears at this time that the project will not be realized.

TABLE 1

DEPARTMENT OF EMERGENCY SERVICES
FACILITIES REQUIREMENTS
(EOC ABOVE GROUND)

Facility	Net (SF)	Gross (SF)	Construction Cost	A&E Costs
Admin	17,000 SF	25,580 SF	$ 1,790,600 (@$70/SF)	$ 102,422
EOC	28,000 SF	40,836 SF	2,858,520 (@$70/SF)	163,507
Subtotal	45,000 SF	66,416 SF	$ 4,649,120	$ 265,929
RIM&C	4,000 SF	5,432 SF	271,600 (@$50/SF)	15,535
Tech Haz	4,000 SF	5,088 SF	254,400 (@$50/SF)	14,552
Comms	4,000 SF	5,000 SF	250,000	14,500
Subtotal	12,000 SF	15,520 SF	$ 776,000	$ 44,587
Total	57,000 SF	81,936 SF	$ 5,425,120	$ 310,516

APPENDIX D

ASSESSMENT OF VIRGINIA'S COMMUNICATION AND WARNING SYSTEM

The Commonwealth's emergency services communications and warning system is comprised of a variety of land-line and microwave radio-based backbone components that provide redundancy. However, this redundancy does not necessarily ensure an operational capability of the system in times of disaster due to the very nature of their design. The Commonwealth of Virginia's communication and warning elements are evaluated below in the context of specific criteria that will hopefully provide a better profile of the systems capabilities in a disaster.

Survivability

Both the land line and microwave components are vulnerable to wind and water. Most of the antenna systems are fixed and not retractable which will significantly impact upon their functional capability following a major disaster such as a tornado or hurricane. Few of the emergency power stations are capable of extended use under full load in a disaster. Some of the remote sites are not adequately equipped to handle extended demand that will be placed upon them in a disaster.

Backup Systems

The vulnerability of the system is exacerbated by the fact that many state agencies do not have alternate equipment, systems, facilities, or sufficient staff to support emergency operations in the event their current systems fail or become inoperable during a disaster.

Services provided by the Amateur Radio Emergency Services and the Radio Amateur Civil Emergency Service, which are volunteer organizations, will allow a certain level of communication to occur between sites where they are established. However, their capabilities are not adequate to handle the total communication demands that will be present following a disaster. Furthermore, these volunteer operators could become victims of a disaster and be unavailable when needed.

Interoperability

Most agencies' communications systems were not designed to be a part of a comprehensive integrated network but were developed to fulfill very specific agency needs. This approach has led to a fragmented communication system made up of diverse equipment with varying capabilities. This diversity has severely impeded effective communication among state agencies as well as between the various levels of government.

Capacity

Capacity relates to the systems ability to provide the necessary level of operational capability within a designated time frame. The main communications cable that serves the Emergency Operations Center is unable to support expanded emergency operations during a disaster as it is currently utilized to capacity. Cable capacity is being increased at the Emergency Operations Center to accommodate the additional equipment that will be set up there, as well as at the Virginia State Police Training Academy. It should be noted that this increased cable capacity is being installed to serve the Emergency Operations Center only at this time. During the increased readiness phase of emergency operations the cable would have to be extended to the satellite facilities. This arrangement would be satisfactory for disasters that are slow in developing and provide some time for preparation such as hurricanes. However, in a disaster that is quick to develop and provides very little or no time to set up these satellite facilities for emergency operations, the Commonwealth would be in a less than desirable position to effectively coordinate and manage the disaster response.

Another shortfall of the system relates to its ability (or inability) to quickly process and disseminate data. Severe weather warnings comprise the majority of warning messages sent over the Commonwealth's emergency services communications and warning system. However, the ability to quickly disseminate real-time severe weather warning messages is hampered by the need to retype and reformat National Weather Service messages onto the Virginia Criminal Information Network. A feedback feature on storm effects via the system is nonexistent.

The Federal Communication Commission is in the process of developing new technology to bring about a more efficient utilization of existing spectrum space. Current radio equipment takes up too much spectrum space. By redesigning the way radios work, the FCC can serve more radios on less or equivalent space. This new technology which will be available in 5-10 years will necessitate the modification or replacement of the equipment that currently makes up the Commonwealth's communication systems at the local and state levels.

Mode

Mode relates to the manner in which the data is transmitted. The majority of today's systems are analog or voice based, and are not capable of fulfilling the digital or data needs of most agencies during normal times, and particularly during disaster times. The additional cable capacity that is being installed at the EOC will have the capability to accommodate the digital needs of the EOC. However, support agency systems may not have this capability.

Transportability

This characteristic relates to the ability to relocate the Virginia Department of Emergency Services system, or portions thereof, in a quick and efficient manner

while ensuring the operational capability of the system once it is reestablished. The current system can be transported with relative ease and speed. However, it may not operate at an optimum manner due to the nature and capabilities of existing components.

The high-frequency, single sideband radio system (Operations SECURE) will contribute significantly to the transportability of the VDES communication system once it is completely phased in.

VDES has a mobile communications vehicle that is equipped with a variety of communications resources that includes high frequency (HF), low and highband, civilian aircraft very high frequency (VHF-AM), marine, ultra-high frequency (UHF), and fixed cellular telephones. The vehicle also has a fixed telephone system, transportable cellular telephones, portable radios, and portable repeaters. Both voice and data transmission capabilities are available, as well as encryption for nonclassified information. This equipment allows the vehicle to serve as a forward command and control vehicle and as the alternate EOC's communications system provider.

Flexibility

Flexibility relates to the system's ability to quickly adapt to rapidly changing events. Due to the state public safety communication system's deficiencies in the areas of survivability, interoperability, mode and transportability, its flexibility is significantly diminished.

Security

A mechanism must be in place to prevent the unauthorized use of or access to the Commonwealth's public safety communication systems or their components. There are some safeguards built into the present system; however, there is a need to enhance them.

EQUIPMENT NEEDS

In order to effectively communicate in a disaster situation, the Commonwealth of Virginia's communication and warning system must include the following equipment:

- Survivable, transportable, interoperable systems that will not only ensure the ability to communicate during a disaster but provide the capability to quickly adapt to and fulfill all the functional demands placed on the system during disaster operations.

- Primary and alternate strategic communications systems to link local EOCs with regional centers, the State EOC, and the federal centers.

- Tactical systems equipped to replace as well as supplement public safety, public information, and public telephone systems in the disaster area.

- Emergency power systems and fuel systems to support and sustain extended operations under full load.
- Antenna systems, including support structures, that are retractable and redeployable following the event.

- Batteries, charging systems, and spare parts to maintain various components of the system during emergency operations.

STAFFING NEEDS

Adequate staff support is needed in the following areas to ensure the efficient operation of system equipment during disaster operations:

- Trained knowledgeable personnel to augment local and state communication staff.

- Additional technical and maintenance personnel to service and maintain the systems in place as well as deployed in the field.

- Emergency communications managers from other states to assist and support Virginia's disaster communications operations.

APPENDIX E

TECHNOLOGICAL HAZARDS PROGRAM

The Technological Hazards Division of the Virginia Department of Emergency Services is responsible for developing, administering, and implementing the Virginia Hazardous Materials Emergency Response Program, which was established by the General Assembly in 1987 by passage of HB 1172. The law also created the State Hazardous Materials Emergency Response Advisory Council to assist the State Coordinator of Emergency Services with program development and implementation.

In establishing the program, the Technological Hazards Division had to assess the hazardous materials response needs of each political subdivision, develop a regional program that addressed the needs identified and define the various program requirements that had to be fulfilled by participating jurisdictions in order to make it a viable program. In developing the 13 locally based hazardous materials regional response teams, the Virginia Department of Emergency Services had to enter into agreements with the 20 jurisdictions that participate in the program and coordinate the development, administration, and provision of a standardized hazardous materials training program for the Commonwealth.

The training component of the Hazardous Materials Emergency Response Program is an essential element in supporting the hazardous materials response teams and consists of the following levels:

- First Responder Awareness Level I (8 hours)
- First Responder Operations (32 hours inclusive)
- Hazardous Materials Response
  - Hazardous Materials Technician (80 hours inclusive)
  - Hazardous Materials Specialist - (136 hours inclusive)
- Incident Command (24 hours inclusive)

The hazardous materials response effort is supported by a three-tiered program based on training levels, personnel, and equipment.

Level II response is based on defensive tactics used to stabilize the hazardous materials incident until more specialized personnel can arrive. Currently 130 of Virginia's 139 jurisdictions are involved in the Level II program which provides both training and funding to these localities. Level II-Enhanced response was developed to give the state better coverage in areas that could not staff and train a Level III team. A Level II-E team will respond to hazardous materials incidents; however, they will not have the full range of resources and training that a Level III team has developed. The Level II-E teams include Bristol, Danville, Giles County, Wise County, Winchester/Frederick County, and the Eastern Shore.

Level III response requires sophisticated equipment and highly technical expertise to intervene and mitigate the hazardous materials emergency. The Level III classification provides a response capability in the form of regional hazardous

materials emergency response teams. The Level III teams participating in the Virginia program include Alexandria, Henrico County, Newport News, Fredericksburg, Portsmouth (supported by Chesapeake, Norfolk, and Virginia Beach), and composite teams from the Roanoke Valley (Salem and Roanoke City), and the central Shenandoah Valley (Augusta County, Harrisonburg, and Rockingham County). These teams, as well as the Level II teams, have agreed to respond to incidents within an assigned response area at the request of the Virginia Department of Emergency Services.

The location and distribution of the Level II, Level II-Enhanced, and Level III teams in Virginia is illustrated in Tab 1.

In addition to these 13 locally based hazardous materials regional response teams, the Department also has 10 hazardous materials officers (HMOs) who are equipped and trained to respond 24 hours a day, year round, in support of local governments and other state agencies, to incidents not requiring a full team. They also respond with the regional response teams at the request of local officials. These 10 hazardous materials officers are located strategically throughout the state in the jurisdictions of Richmond City, Culpeper, Dublin, York County, Wise County, Prince William County and Norfolk to ensure a prompt and effective response to incidents. They also provide training, technical advice and assistance, as well as serve as liaisons to local coordinators and teams.

HISTORICAL TRENDS

Hazardous materials incidents reported to the Virginia Emergency Operations Center have increased dramatically since 1983 as illustrated in Tab 2.
Between 1987, when the program was established, and 1992, the number of hazardous materials incidents reported to the Virginia EOC increased by 1,493 reports or 233 percent. This increase can be attributed to increased public awareness of the program and proper training, as well as the increased volume of hazardous materials being transported, stored and manufactured throughout the state. Tab 3 provides a profile of where these incidents occurred throughout the state during 1992. As can be seen from the chart, approximately 73 percent of the incidents occurred in the eastern half of the state, represented by Hazardous Material regions I, II, III, and VII during 1992. The remaining 573 cases or 27 percent occurred in Regions IV, V, VI, and VIII.

Tab 4 illustrates the percentage breakdown of incidents reported by transportation mode/facility. As illustrated, the majority of incidents occurred at fixed facilities (48 percent), followed by marine incidents (20 percent), highway, (13 percent), and illegal dumping (11 percent).

Assessment of Technological Hazards Program

The first three years of program funding was adequate to develop, operate, and maintain the hazardous materials response program. However, funding for the subsequent years that followed has been less than adequate to maintain a standard level of response capability throughout the state.

In 1989, the Technological Hazards Division of VDES received a total of $1,456,205 from the state to support the Technological Hazards Division and the local teams. In the current fiscal year, funding was reduced to $1,169,702, which represented a $286,503 cut (19.7 percent). In order to maintain the response teams' level of readiness, the Technological Hazards Division absorbed the majority of the fund reduction as illustrated in Tab 5.

In addition to these reductions, the Division is anticipating additional state and federal funding reductions in the 1994-96 biennium. The Radiological Protection Branch , which is 100% federally funded and currently staffed by three individuals, may be eliminated altogether. This Branch develops, maintains, and conducts specialized radiological training in the Commonwealth. It is responsible for specialized training around the nuclear power facilities, the transportation monitoring program, and the radiological instrument maintenance and calibration program for both state and federal facilities. If this program is retained, FEMA has indicated that there may be a state match requirement in future years.

Between 1988-1992, the number of on-scene responses by Level II-E and Level III teams increased 573 percent. In addition to this, the state has become more involved in recent years, as the on-scene coordinator at EPA sites within the state. This has created the need for more sophisticated sampling and monitoring equipment, as well as a response trailers. There is also a need for three additional senior hazardous materials technicians in the field to better serve the Tidewater, north central, and southwestern areas of the state.

Level II and Level III teams receive $15,000 and $30,000, respectively, to purchase new and replacement equipment. This support has remained constant since the program's inception. However, when one takes into consideration the increased cost of replacement equipment due to technological advances as well as basic inflation, the purchasing power of this funding support is significantly reduced.

The current source of supplemental funding for the hazardous materials training program is Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA Title III program), which began the same year that the Technological Hazards Division was established. However, this is the last year for training funds from the SARA Title III program.

Fortunately, there is another source of federal funding for hazardous materials training provided under the Hazardous Materials Transportation Uniform Safety Act (HMTUSA) of 1990. Although the training program under this legislation is similar in terms of the subject matter it addresses, it is not as flexible as the SARA Title III program.

One major difference between the HMTUSA program and the SARA program is the state match requirement. The training funds under the SARA Title III program require a 20-percent state match. The HMTUSA program first determines a "level of effort" required by the state using the amount of state funds expended on hazardous materials the previous two fiscal years as the basis for this assessment.

In the case of Virginia, the level of effort for the first year's participation in the program was determined to be $94,000. In addition to this amount, the state is also required to provide approximately $26,000 match in the first year, totaling $120,000. A key feature of the HMTUSA funding formula, as it relates to the state's funding obligations under the program, is that the level of effort required for program participation increases each year the state participates in the program. For example, in the second year the level of effort from the state will increase by the amount of the state match from the previous year or $26,000. The state level of effort would increase to $120,000 and then the state must match federal funds on a 20/80 basis after the level of effort is met. This feature may preclude the state from participating in the program after the first year due to the potential lack of adequate state funding to support the program.

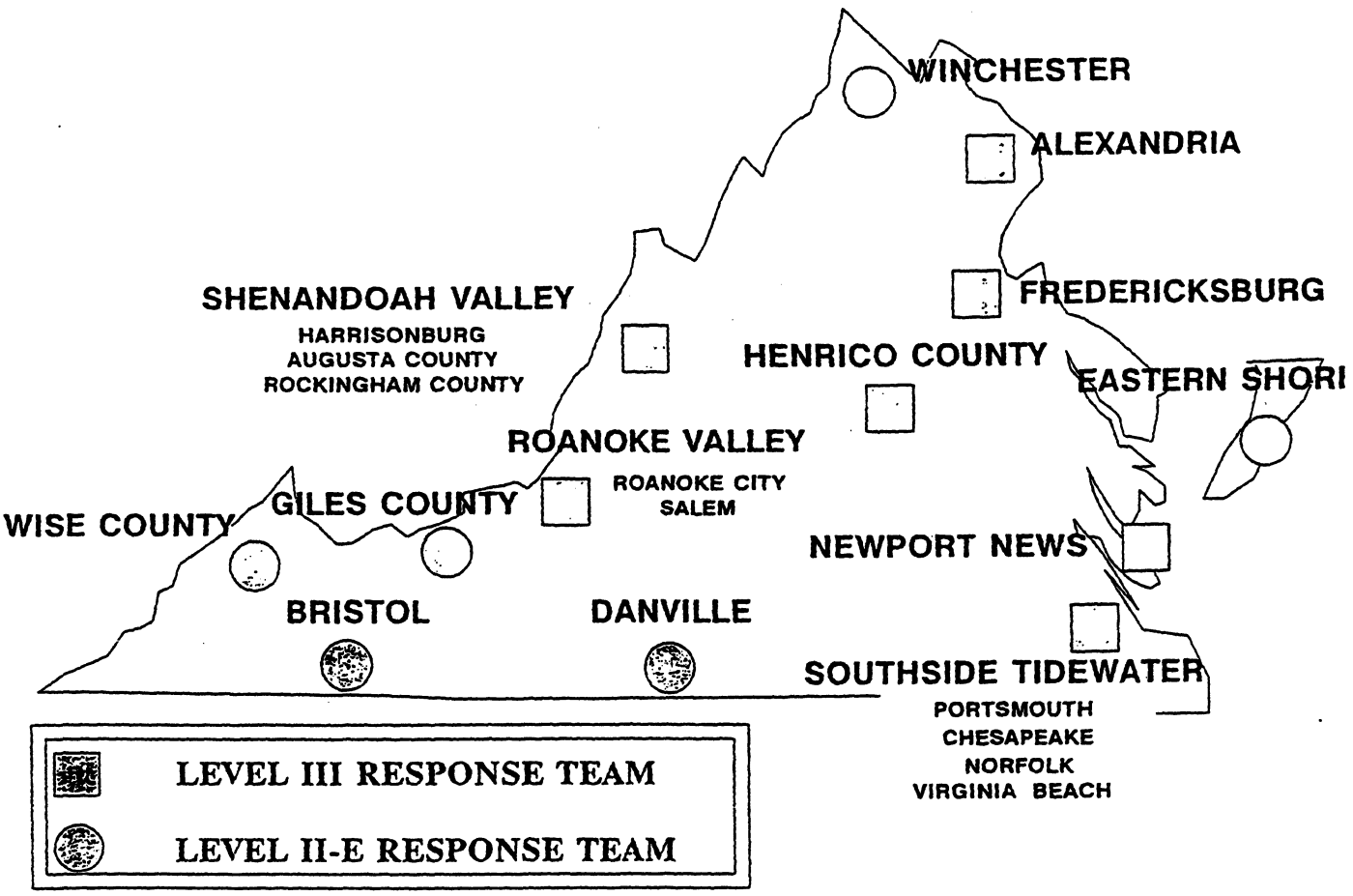
Training Focus and Responsibilities Redefined

Currently, the Hazardous Materials Training program is structured and staffed to serve the hazardous materials response teams. However, the agency has determined the need for a more extensive training program that will reach fire department personnel throughout the state.

The Technological Hazards Division has also assumed additional training responsibilities in the recent agency reorganization. In addition to being responsible for the development and instruction of the response team component of the hazardous materials training, the Technological Hazards Division will also be responsible for providing First Responder and Incident Command training programs as well. This situation has resulted in the need for an additional full-time training staff person and one secretary.

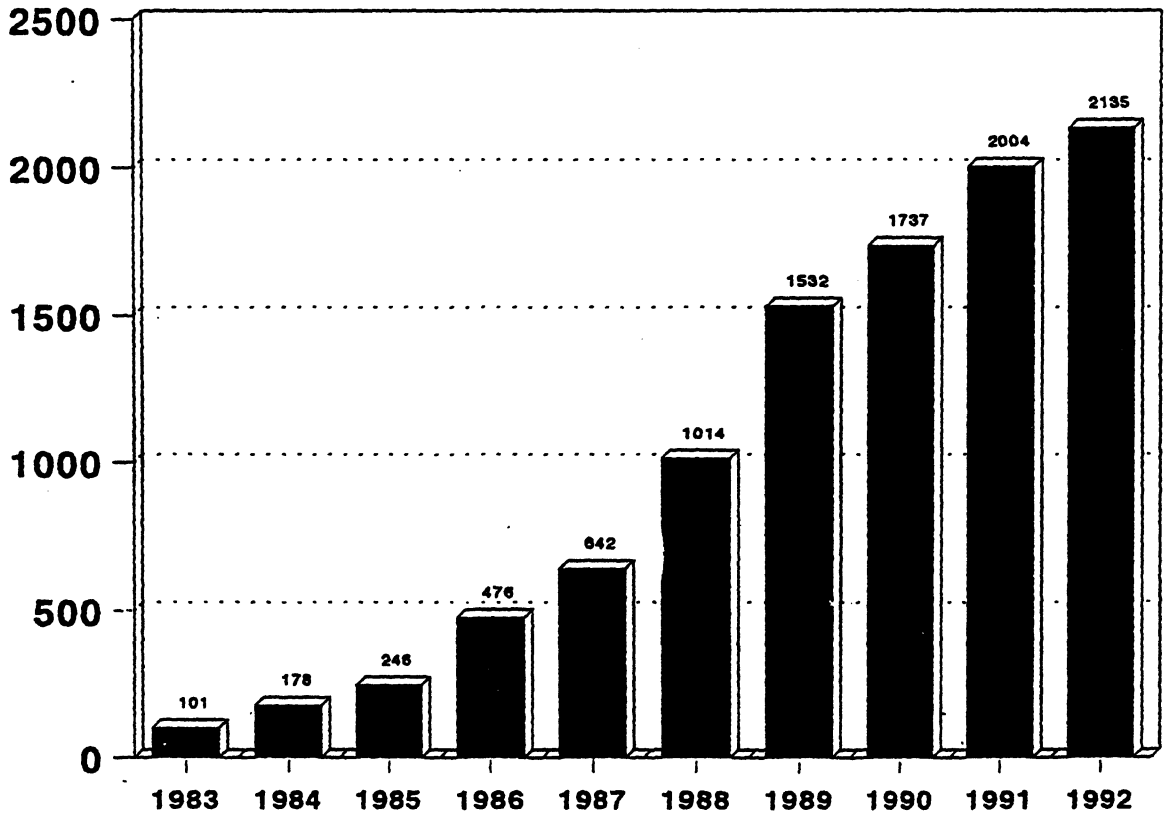
Tab 1

Location of Hazardous Material Teams



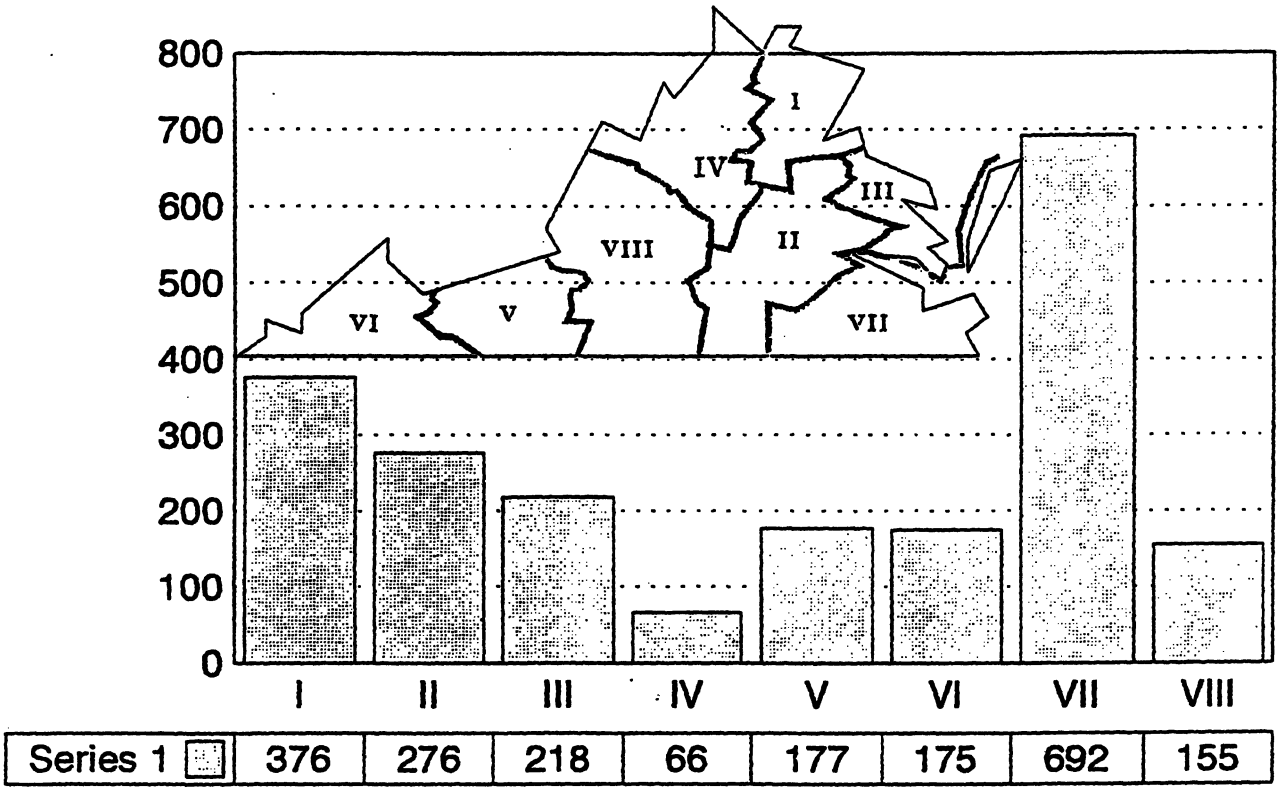
Tab 2

Trends in Hazardous Material Incidents



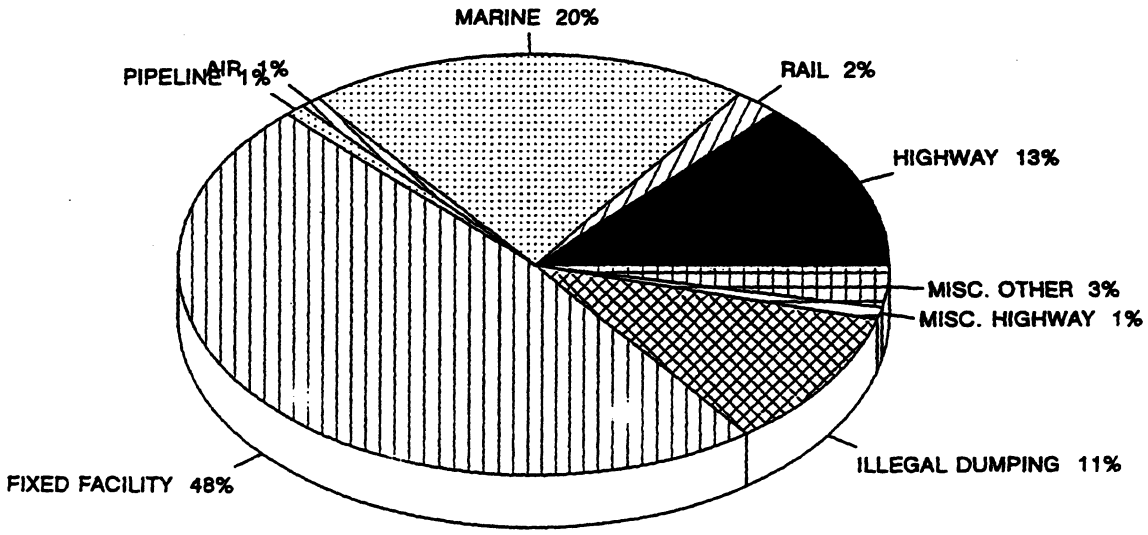
Tab 3

Location of Hazardous Materials Incidents



Tab 4

Incidents Reported by Transportation Mode/Facility



1992

Tab 5

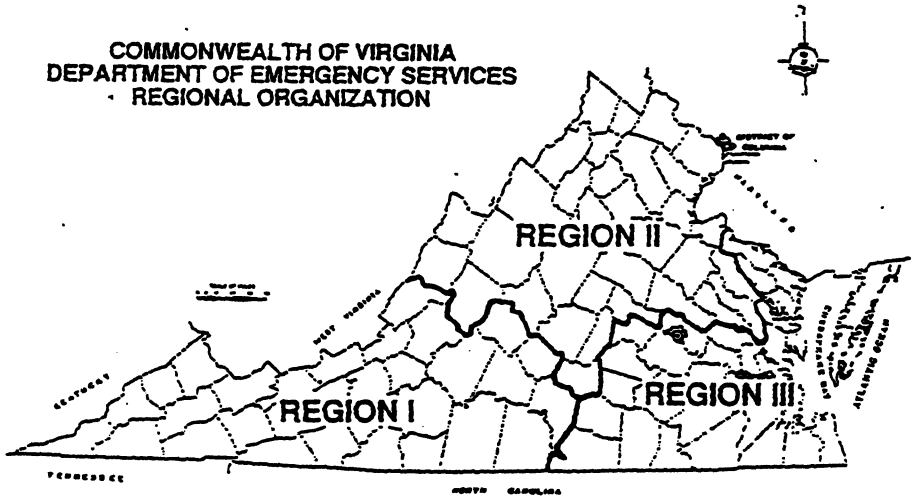
Trends in State Haz-Mat Funding Support

Program	Funding by Year			Net Change		Percent Change	
	1989	1992	1993	89/92	89/93	89/92	89/93
Main/Ops	1,031,205	915,922	802,170	115,283	229,035	11.2%	28.6%
Pass Thru (Teams)	425,000	371;025	367,532	53,975	57,468	12.7%	13.5%
Total	1,456,205	1,286,947	1,169,702	169,258	286,503	11.6%	19.7%

APPENDIX F

REGIONAL FIELD OFFICES

The current Virginia Department of Emergency Services regional organization, as is illustrated in the map below, can best be described as service areas rather than cohesive groups of jurisdictions that are integrated in terms of planning, training, and resource support.



Region I, which covers the southwest portion of the state, is comprised of 45 jurisdictions with a total 1990 population of 1,292,595. This population represents approximately 21 percent of the state's population. Although the area contains the urban centers of Roanoke, Lynchburg, Danville, and a portion of the Kingsport metropolitan area, the region can be generally characterized as being more rural in nature than the other two regions described below. Twenty-seven of the forty-five jurisdictions receive financial support through the Emergency Management Assistance[9] program described earlier. Only four of the forty-five local coordinators in Region I are presently considered full-time. The Virginia Department of Emergency Services office in this region is located in Pulaski.

Region II covers the central, western, and northern portions of the state. It is made up of 47 jurisdictions with a total population of 2,417,629, which represents approximately 39 percent of the state's population. This region includes the Virginia portion of the Washington metropolitan area and the Charlottesville metropolitan statistical area (MSA). Twenty-one of the forty-seven jurisdictions or 29 percent participate in the Emergency Management Assistance (EMA) program. Five of the forty-seven local coordinators (10 percent) are currently classified as being full-time. The regional office is located in Culpeper.

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9 Emergency Management Assistance (EMA) is a program of federal financial aid to state and local governments on a 50/50 matching basis. At the federal level, the Federal Emergency Management Agency administers the program to the states and the Department of Emergency Services administers it to local governments.

Region III is comprised of 46 jurisdictions in the central, southeastern portion of the state. This region has a population of 2,479,083 and represents 40 percent of the state's population. Ten of the forty-six local coordinators (22 percent) in the region are considered full-time coordinators, and twenty-five, or 54 percent, of them receive financial support under the EMA program. The regional office for this area is located in Hayes, Virginia.

Assessment of Regional Field Offices

The regions, as well as the jurisdictions that comprise these regions, are very diverse in terms of their population, infrastructure, resources, and emergency management capabilities. The eastern portions of Regions II and III include 44 localities that have been called the "golden crescent." This area ranges from Fairfax County to Virginia Beach and has captured almost 95 percent of the state's population growth between 1980 and 1990.

The regions as they currently exist are too large and unwieldy to develop any meaningful programs in the areas of regional planning, training, or resource support. In order to effectively enhance regional capabilities in these areas, the regions must be reduced to more manageable areas that are better aligned in terms of the hazards that exist in the area, resources available, and other socio-economic factors.

APPENDIX G

MUTUAL AID PROGRAM ASSESSMENT

The State Emergency Operations Plan encourages local directors of Emergency Services to develop formal mutual aid agreements with adjacent political subdivisions. There is no requirement for such agreements to be developed. Many of the mutual aid agreements that do exist among political subdivisions in the state are verbal rather than written.

When a major incident or disaster occurs in many of the state's political subdivisions that quickly overwhelms the jurisdiction's response capabilities, the political subdivision generally calls the state directly for assistance. It is a one-step process involving a telephone call from the locality to the DES Regional Coordinator or, in larger events to the State EOC.

Assessment of Mutual Aid

There is no system in place that would mobilize local resources and assistance on a regional basis, with the exception of the hazardous materials program. In a catastrophic event, it will be necessary to establish a mechanism to identify and mobilize local resources outside of the region and effectively channel them to the impacted area. However, before such a system can be implemented statewide, many questions regarding such things as liability, insurance, methods of payment, and who has control of these assets in the response, must be addressed.

In a disaster of catastrophic proportions, such a system, if properly developed, would have the capability to provide disaster aid in a prompt, organized, and effective manner, prior to the incident occurring, during the event, and particularly in those critical hours and days immediately following the disaster's occurrence.

Disasters can involve one jurisdiction, several jurisdictions, or an entire region. The capability to respond effectively will vary from jurisdiction to jurisdiction, as well as from region to region. Therefore, the threshold to activate the mutual aid system will vary accordingly.

Such a system would require all political subdivisions in the state to sign a master mutual aid agreement that would create the system through which mutual aid would be implemented in a disaster situation. The state would also be a signatory to the agreement as it would provide and coordinate assistance to the disaster area in the event that regional resources were overwhelmed. All jurisdictions providing aid or assistance would retain control over their own personnel and resources.

Depending on the disaster, mutual aid regions may be activated in whole or in part, or in conjunction with other regional components of the system and state assistance, if the situation demanded it. For example, if a hurricane struck the coast of Virginia, mutual aid regions to the west and north of the impacted area would be activated. These mutual aid regions would also be activated prior to the disaster to provide shelter for evacuees who will be leaving the disaster area. At the present

time, evacuees would not be advised to go to any one particular jurisdiction for shelter. Also, many jurisdictions have not developed shelter agreements with outlying areas. A statewide mutual aid system would provide a framework to identify, mobilize, and deploy resources and services to impacted areas in a more prompt, effective, and efficient manner.

Also, under such a system, the state could inventory the critical resources available within each region. The state would then know beforehand what resources and services are available within the various regions, their operational capabilities and requirements, and how quickly they could respond. Regional training and exercises could be developed to enhance regional deployment of resources. Under a statewide mutual aid system, local resources and services would complement state assets more effectively and to a greater degree than at the present time. The technology exists to make such a system work.

The system should have the capability to quickly determine if regional assets could effectively assist in the response to and recovery from the disaster. If the region does not have the kinds of resources in the quantities necessary to satisfy the demands of the situation, then state-level assistance would be activated. State resources located at district or regional offices throughout the state would be considered a part of a region's assets.

The state already has a regional network of response under the hazardous materials program described earlier. This statewide mutual aid system would be more comprehensive in scope and complement state-level resources.

The regional resource inventory could also be used to support the Interstate Compact recently developed by Virginia, under the auspices of the Southern Governors Association. All nineteen member states that comprise the Association are signatory to the agreement. This agreement, which is the only one of it's kind in the country at this time, provides the framework under which mutual aid will be requested, received, and utilized in times of disaster. Supplementary support agreements and procedures will be developed by member states to facilitate the implementation of the agreement once it is enacted. This process will begin with those states that are contiguous to the Commonwealth of Virginia. The Department of Emergency Services has already been in contact with the states of North Carolina, Maryland, and Tennessee in this regard.

APPENDIX H

DISASTER RECOVERY ASSISTANCE

There is nothing in Virginia's history that compares to the level of devastation caused by a catastrophic disaster such as Hurricane Andrew, as was indicated earlier. Table 1 provides a frame of reference as to the volume of claims generated and the total amount of federal funds expended as a result of Hurricane Andrew, under the various assistance programs coordinated by the Federal Emergency Management Agency.

Table 2 provides a summary of the number of individual assistance applications processed for the previous disasters that occurred in 1985, 1989, and 1992. The number and estimated value of public assistance claims associated with the 1985, 1989, 1992, and 1993 disasters are provided in Table 3. As can be seen from this information, the level of assistance provided in Virginia's disasters pales in comparison to the assistance that would probably be required following a catastrophic disaster.

TABLE 1

TOTAL FEDERAL FUNDS OBLIGATED FOR HURRICANE ANDREW RECOVERY UNDER ASSISTANCE PROGRAMS COORDINATED BY FEMA AS OF 7/19/93

		($ Millions)
Public Assistance Obligated Funds		$942.0
Debris Removal	$540.0	
Rebuild Infrastructure	$402.0	
(DSRs obligated: 10,073)		
Individual Assistance Program Applications Received = 184,983		
(Application period totaled 261 days, ended 7/1/93)		
Temporary Housing		$107.6
(46,982 families assisted)		
Mobile Homes		$20.0
(Peak Occupancy: February 12, 3,510; Present, 2,800		
Individual and Family Grants		$187.3
(61,590 applicants; federal/state share, 75/25%)		
Response Costs including Military		$389.0
(17,511 loans approved)		
Small Business Administration Business Loans		$226.0
(5,097 loans approved)		
Disaster Unemployment Assistance		$12.4
(7,236 claims)		
Crisis Counseling		$18.5

Source: FEMA Joint Information Center, Miami, Florida.

TABLE 2

SUMMARY OF INDIVIDUAL ASSISTANCE CLAIMS FOR VIRGINIA'S 1985, 1989, AND 1992 DISASTERS

	1985	1989	1992
Applications Submitted	2,353	275	257
Approved	1,920	91	160
Disapproved	334	182	94
Withdrawn	99	2	3

Source: Virginia Department of Social Services.

TABLE 3

SUMMARY OF PUBLIC ASSISTANCE CLAIMS FOR VIRGINIA'S 1989, 1992, AND 1993 DISASTERS

	1985	1989	1992	1993
Damage Survey Reports	3,583	241	1,080	68
Total Dollars	$19,325,290	7,496,652	$6,067,056	$5,223,365

Source: Virginia Department of Emergency Services.