

Running head: Risk Analysis and Capability Assessment

Risk Analysis and Capability Assessment for Technical Rescue Incidents in York County,

Virginia

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CERTIFICATION STATEMENT

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

Signed: _____

Abstract

In 1995, the York County Department of Fire and Life Safety established a technical rescue team. This team was trained and equipped to handle a variety of specialized rescue situations for the hazards and risks known to York County at that time. The problem is that since the establishment of this team, York County Department of Fire and Life Safety (YCFLS) has not continued to adequately evaluate the risks that our community faces relating to potential technical rescue incidents and the capability of the department to mitigate them.

The purpose of this research was to determine what potential for technical rescue incidents exists in York County and if YCFLS has the capability to mitigate them safely and effectively.

The author used the descriptive research method to include a literature review, historical review, a questionnaire, a focus group, and personal interviews and communications to answer the following research questions: What types of technical rescue situations is York County susceptible to? What is the risk potential for identified technical rescue situations? What are the capabilities of YCFLS related to technical rescue? What mutual aid and/or other resources are available to YCFLS to assist in the mitigation of identified potential technical rescue incidents.

The results of this research provided recommendations to YCFLS that include the need to train all personnel up to the awareness level in identified technical rescue fields, reinstitute regional training, develop standard operating procedures, begin a team evaluation process, and continue to monitor work sites that involve the potential for technical rescue incidents to occur.

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Introduction

In society, when a person gets into an emergency situation in which they can no longer control, they call 911 and expect the emergency services from their locality to respond and make everything better. Essentially, the emergency services are, in many cases, the last ditch effort for our citizens to have an unfortunate incident or situation contained and controlled. The men and women of the fire service put their lives and equipment on the line every day in an effort to assist in stabilizing the chaos that disrupts our daily activities. What happens when these emergency workers come across a situation that they can't handle with the standard tools, training and experience that the fire service provides to our front line fire and EMS personnel? Incidents involving high angle, confined space, trench/excavation, and structural collapse situations require more than the average engine company knowledge, skills, abilities and equipment to safely and effectively manage.

York County is not exempt from these types of situations. Therefore, the management and staff of the York County Fire and Life Safety (YCFLS) trained and equipped a core group of personnel in an effort to be prepared to handle such emergency incidents if and when they occur.

The problem is that the York County Department of Fire and Life Safety has not adequately evaluated the risks that our community faces relating to potential technical rescue incidents and the capability of the department to mitigate them thus placing citizens and workers at risk.

The descriptive research method was used to determine what potential for technical rescue incidents exists in York County and does YCFLS have the capability to mitigate them safely and effectively. Utilizing a literature review, historical review, a questionnaire, a focus group, and personal interviews and communications the following research questions were

answered: What types of technical rescue situations is York County susceptible to? What is the risk potential for identified technical rescue situations? What are the capabilities of YCFLS related to technical rescue? What mutual aid and/or other resources are available to YCFLS to assist in the mitigation of identified potential technical rescue incidents.

Background and Significance

York County Fire and Life Safety (YCFLS) is a combination career and volunteer department with over 180 members that operate out of six strategically located fire stations, an administration building, and a training center located and shared with the Virginia Dominion Power, Yorktown Power Station. Currently, YCFLS, in partnership with the Virginia Department of Emergency Management, is working with two State Homeland Security Program Grants, donations, State and local funding to design and build a state-of-the-art HAZMAT / CBRNE training center in York County.

In the late 1980's and early 1990's, YCFLS, working with funds provided by a successful bond referendum, built three new fire stations and purchased all new fire apparatus. The placement of the new stations provided that emergency units leaving the fire station would arrive at an emergency scene in the majority of County areas within five minutes or less. All stations have a minimum of an engine and an advanced life support medic unit. Together, they form a "Company" with a minimum of four personnel. They respond together on most every call from car fires to commercial structural fires to chest pain calls. The engine lieutenant is in charge of this four person company (M. B. Player, personal communications, December 20, 2010). Fire Station One and Fire Station Three are designated as District Stations. In addition to the engine and medic unit, the two district stations are staffed with a ladder, medium duty rescue, brush truck and tanker providing additional resources to the upper and lower areas of the County.

These additional units are staffed and respond depending on the call by a task force of four personnel minimum. This task force is lead by the District Captain which is also in charge of all of the engine/ medic companies within their end of the County. The District Captains report to their Shift Commander/Battalion Chief. (J. S. Payne, personal communications, December 20, 2010). The District Stations also provide additional emergency medical resources, as needed, by way of reserve medic units that can be placed into service during peak times using available staff at these stations. (T. A. Schwalenberg, personal communications, December 23, 2009).

The York County Department of Fire and Life Safety is a very progressive county government emergency services agency protecting approximately 65,000 citizens and over 23,000 households in addition to daily workers, visitors, tourists, commuters and travelers (York County Office of Economic Development, 2009). The department provides a wide range of services including fire protection, code enforcement, fire inspections, plans reviews, fire investigations and public fire and life safety education. The department also coordinates the County's emergency management activities, provides fire suppression, emergency medical services, rescue services and hazardous material responses. It provides: professional fire and life safety training and training program management; command and control of major emergencies; information management services; grant administration services; victim and occupant assistance services; special events coordination; water and dive rescue; technical rescue; mass casualty incident management; medical response to weapons of mass destruction and mass patient care (R. P. Long, personal communication, January 5, 2009). YCFLS also participates in several regional, state and federal response programs including: Federal Emergency Management Agency Urban Search and Rescue Virginia Task Force Two (VA-TF2), Department of Health and Human Services Virginia - 1 Disaster Medical Assistance Team, Tidewater Regional

Technical Rescue Team, Peninsula Regional Technical Rescue Team, Hampton Roads Metropolitan Medical Response System, and the Hampton Roads Maritime Incident Response Team. In the 2009 calendar year, the department responded to 8,718 fire and rescue incidents that required 18,025 fire and rescue unit responses. The average response time was 4.7 minutes (Operations Division, 2009).

York County is located in the southeast area of Virginia commonly referred to as Tidewater. Tidewater is comprised of many localities including the cities of Virginia Beach, Norfolk, Chesapeake, Hampton, Newport News, Williamsburg and the counties of James City, Isle of Wight and York. York County is bordered by the York River and multiple tributaries of the Chesapeake Bay to the north and east. There are more than 230 miles of property that front these waters (M. B. Player, personal communication, October 20, 2009).

In the early 1990's, a core group of YCFLS personnel began training in the specialty areas of rope, trench and confined space rescue. This core group of personnel made a presentation to the fire chief of their training and several of the target hazards in the County that would warrant this type of training and specialized equipment. The chief supported this proposal and secured funding for the training of additional personnel and the purchase of some of the specialized equipment (J. S. Payne, personal communication, December 28, 2010).

Personnel were trained to fully staff a station on all three 24-hour shifts. A selection process was held and selected personnel were all assigned to the Yorktown Fire Station so as to be strategically located in the center of the County. This was the start of the YCFLS Technical Rescue Team (J. Rhodes II, personal communication, February 2, 2011). The team then became a member of the Tidewater Regional TRT and the Federal Emergency Management Agency Virginia Task Force Two Urban Search and Rescue Team in 1997.

Although the team continues to add equipment and train for technical rescue incidents there has not been a formal analysis conducted to determine what the County is most susceptible to and if the County is prepared to handle these incidents. This research paper specifically relates to the terminal objective of unit four of the Executive Analysis of Fire Service Operations in Emergency Management Student Manual titled *Community Risk and Capability Assessment* by applying a process to describe and assess risks within our community and assess our department's resource capabilities in relation to these risks (FEMA, 2009).

Literature Review

An extensive literature review was conducted utilizing the Learning Resource Center (LRC) at the National Fire Academy (NFA), the internet, personal interviews, surveys, consensus standards and a review of internal York County files and documents.

A review of the National Fire Protection Association (NFPA) Standards revealed that there are two standards that are directly related to this research. The first is NFPA 1006, *Standard for Technical Rescuer Professional Qualifications*. This standard identifies the knowledge and skills necessary for emergency responders to perform or direct a technical rescue. It also provides a list of recommended equipment needed for a technical rescue team for the various technical rescue disciplines.

The second NFPA standard applicable to this research is NFPA 1670, *Standard on Operations and Training for Technical Search and Rescue Incidents*. This standard identifies the training, staffing, management and other requirements of technical rescue operations and training. This standard also dictates that departments that have technical rescue teams shall have standard operating procedures specific to the TRT, minimal training for the capabilities of the team, and an annual team evaluation process in place.

A search for technical rescue incidents in the YCFLS incident reporting database revealed that there were 88 technical rescue incidents between 2001 and 2010. The majority (84 percent) of these calls were related to structural collapse or weakened structures.

A review of training records of all YCFLS employees revealed only a very small percentage of personnel had training in the technical rescue subjects contained in this research. For TRT members, YCFLS requires a minimum of three hours of special operations training per month.

A review of the YCFLS 2010 staffing reports showed that on average four technical rescue team members are on duty per shift. Additionally, an average of three administrative staff personnel was on duty during the day on weekdays (Operations, 2010).

The Virginia Department of Fire Programs' (VDFP) mission is to provide funding, training and educational programs to enhance public safety throughout the Commonwealth; and to enforce building code, statewide fire prevention code, and life safety code compliance (Virginia, 2011). VDFP provides the training for fire and rescue personnel in trench, rope, confined space, structural collapse, and other specialty rescue topics following the NFPA 1670 standard (D. Layman, personal communication, January 13, 2011).

Michael Brown describes the three needed elements required to successfully perform special rescue operations as special people, special training and special equipment. He further discussed the *hazard curve paradox*. The hazard curve paradox dictates that even though technical rescue calls are extremely hazardous, even as compared to fires and EMS calls, their low frequency creates bad statistical data and, therefore, creates an environment where the training, equipment and personnel can be underfunded or not funded at all (Brown, 2000).

Chase Sargent (2000) wrote, "there are three basic options from which a department can decide its ultimate future: It can refuse to respond to confined space emergencies, it can function as a backup response team, or it can accept its responsibility and prepare." He goes on to say "the only course that makes sense is to accept the responsibility and prepare" (p.35).

James Pellitteri (2009) discussed the need to preplan identified target hazards. He states "preplanning has encouraged [equipment] purchases and has given us confidence that we are adequately equipped if the time comes" (p.46).

Steelintheair.com (2011) states that the number of cell towers was expected to rise 48 percent from 175,000 to 260,000 between 2006 and 2010. They further state that AT&T and T-Mobile collectively deployed 5,000 or so *macrocell towers* over the last few years themselves. Harris Communications (2011) defines macrocell as "a cell in a mobile phone network that provides radio coverage served by a power cellular base station tower."

Chase Sargent (2000), in his book *Confined Space Rescue*, mentions a triple fatality confined space incident that occurred aboard the aircraft carrier Harry S. Truman while under construction at the Newport News Shipyard in 1997. He states, "while under construction in the yard, three workers were killed when they disconnected a waste line that was still active. Raw sewage flooded into the space and immediately contaminated the interior atmosphere" (p.176). This author was one of the first arriving members of the Tidewater Regional Technical Rescue Team that responded to this incident and, therefore, has first-hand knowledge of this incident. This was a very difficult operation due to the logistics involved with getting equipment on board the ship and then down to the lower levels where the incident occurred. This location also created a difficult situation for decontamination of the victims, rescuers and equipment, as there was not enough room to decontaminate and capture the fluids in the work area. Therefore, all personnel and equipment were brought to the hanger deck for decontamination and then a cleaning crew had to clean the

path between the incident and the hanger deck. Former Assistant Chief of Special Operations David Layman states that this incident lasted over 14 hours and required an estimated 50 technical rescue team personnel, 40 additional fire and rescue personnel and many Navy and ship yard personnel to mitigate this incident (D. Layman, personal communication, January 15, 2011).

In summary, York County appears to be very susceptible to an incident requiring TRT assets to mitigate the situation. The findings within this literature review indicate that the capability assessment of YCFLS to mitigate TRT incidents safely and effectively will require most of the attention of the research project. The culmination of the literature review provided the author with the body of knowledge to address the research questions contained in this Applied Research Project (ARP).

Procedures

The research began with a literature review of Internet websites, trade journals, applicable standards and other print media in an effort to locate information relevant to this research project. A literature search was conducted at the National Emergency Training Center's Learning Resource Center and at the YCFLS Library. As the focus of this research is based primarily on the potential risk relating to technical rescue situations that York County faces and the capabilities of YCFLS to handle them safely and effectively, the Internet and print media provided very little applicable information relevant to the author's research questions.

A thorough review of YCFLS documentation was conducted throughout the research process. Electronic incident reports and staffing reports were reviewed. Additionally, equipment cache lists for the YCFLS TRT was reviewed and compared to equipment carried by the Newport News, Hampton and Virginia Beach technical rescue teams.

To determine the average staffing of TRT personnel per shift the author used daily staffing reports for calendar year 2010. TRT qualified personnel were identified on each day and the numbers of personnel on duty were recorded. For purposes of this study, sick, annual, military and other leave was rounded to the nearest half day. The staffing for each month was divided by the number of days the shift worked in that month. The figures for each month in 2010 were added together per shift and divided by 12 months to get the average daily staffing for 2010.

The author conducted four interviews for this research. 1) Matt Phillips, Senior Safety Engineer with the Dominion Virginia Power (DVP) Yorktown Power Station. Mr. Phillips is the direct contact between YCFLS and DVP Yorktown Power Station and typically supervises all safety aspects of the Power Station and contractors on site; 2) Mike Smith, Site Forman for the Superior Industrial Maintenance Company. Superior is conducting repairs to large below grade fuel storage tanks at the Defense Fuel Supply Depot located at the United States Coast Guard (USCG) Training Center, Yorktown; 3) Ellen Medford of the York County Environmental and Development Services. Mrs. Medford is responsible for compiling data and other information on development and construction of utilities in York County; 4) Josh Loftheim, owner of Global Tower Contractors in Williamsburg, Virginia.

The York County Graphic Information Services (GIS) was also consulted to provide information on below grade utility information and cell tower population in York County.

A focus group discussion was held at the FEMA Urban Search and Rescue Virginia Task Force Two office in Virginia Beach, VA to discuss the capabilities as individual jurisdictional teams and as a region, mutual aid agreements and regional training issues. Attending this

discussion was a representative from the technical rescue teams of Virginia Beach, Chesapeake, Norfolk, Newport News, Hampton, James City County, and Navy Region Hampton Roads.

A survey was assembled using SurveyMonkey.com (Appendix A). Assisting with the production of the survey was Captain James Rhodes II and Captain Richard Paul Long. Both of these personnel have over 20 years fire and rescue experience and are founding members of the YCFLS Technical Rescue Team. An email was sent to the 17 Engine Company Lieutenants with 16 of them replying by the cut-off date of January 1. The email included a description of my research project and the link to the survey. The survey was anonymous; however, they could be tracked by fire station districts. The focus of the survey was to determine what the Company Officers feel are the technical rescue target hazards and types of technical rescue situations in both their first due district and the County as a whole. They were also asked about their knowledge of the TRT's capabilities and their ability to recognize and request that response of the TRT. Additionally, relevant information regarding respondent's time with the department, technical rescue training and equipment familiarization and was also obtained.

The potential lack of experience and knowledge of the respondents in the realm of technical rescue activities, equipment, and responses may provide some limitations in the responses to this survey. It is assumed that the respondents provided their answers truthfully and with their best judgment and experience in mind.

Definition of Terms

Authority Having Jurisdiction: An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure (NFPA 1670, 2009, section, 3.2.2).

Awareness Level: the minimum capability of organizations that provide response to technical search and rescue incidents (NFPA 1670, 2009, section, 4.1.4).

High Angle Rescue: Any situation where the victim is elevated above or below ground and must be moved and/or rescued by the use of rope and/or mechanical advantage systems and rigging (Charlottesville, 2011).

Non-Permit Required Confined Space: A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm. In this space, it is unlikely that an Immediately Dangerous to Life or Health (IDLH) or engulfment hazard would be present, and all other serious hazards have been controlled (Merrick, 1998, p.173)

Operations Level: the capability of organizations to respond to technical search and rescue incidents and to identify hazards, use equipment, and apply limited techniques specified in this standard to support and participate in technical search and rescue incidents (NFPA 1670 – 4.1.4)

Permit Required Confined Space: A space large enough and so configured that an employee can bodily enter and perform assigned work; has limited or restricted means for entry or exit (e.g., tanks, vessels, silos, storage bins, hoppers, vaults, and pits); is not designated for continuous employee occupancy (OSHA, 1998, p.460).

Technician Level: the capability of organizations to respond to technical search and rescue incidents and to identify hazards, use equipment, and apply advanced techniques specified in this standard necessary to coordinate, perform, and supervise technical search and rescue incidents (NFPA 1670 – 4.1.4)

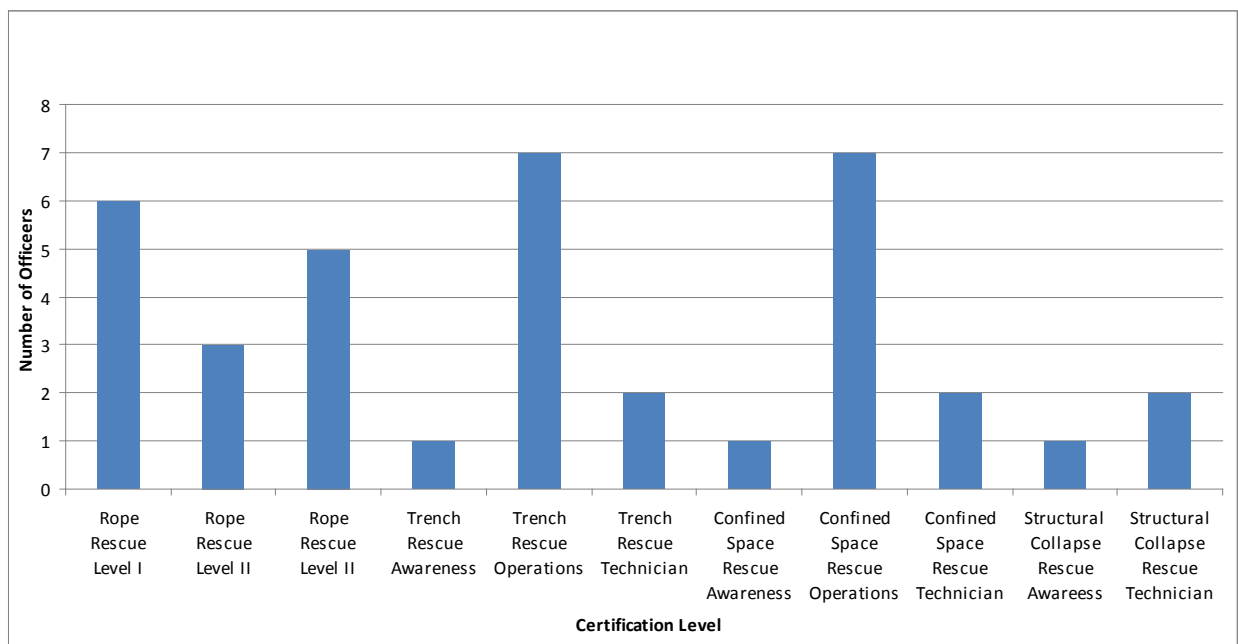
Trench/Excavation: A narrow (in relation to its length) excavation made below the surface of the earth (NFPA 1670 – 3.3.175)

Results

What types of technical rescue situations is YCFLS susceptible to?

A survey was sent to each YCFLS company officer in an effort to determine what they have identified as potential technical rescue situations within their first due district and the County as a whole. The first three questions in the survey were designed to provide the author with the level of experience and training of the engine company officers as related to the topics of this research project. The survey revealed that of the 16 officers that responded, four of them have 11-15 years of fire service experience, seven have 16-20 years of experience, three have 21-25 years, and two have greater than 25 years of experience. The officers’ training in technical rescue varied. Figure 1 shows the levels of training for the 16 officers that responded to the survey:

Figure 1: Company Officer Technical Rescue Training Levels



After establishing some basic training, experience and district assignments for the respondents, there were three questions relating to this research question. The first question was: In your opinion, what technical rescue situations is your district susceptible to? The available answers mirrored the focus of this research paper as high angle, trench, confined space, and structural collapse. Structural collapse was noted by all 16 respondents (100 percent) that it was a potential problem in their district. Trench incidents received the next highest concern with 15 respondents noting it is an issue for their district. Fourteen officers noted confined space incidents were a concern for their district and thirteen noted high angle incidents.

The next survey question asked the officers to pick which one of the four technical rescue incidents their district was most susceptible to. Structural collapse was picked as the highest concern by seven of the sixteen officers. The second most concerned was trench followed by high angle and confined space with four, three and two officers picking them respectively.

The survey then asked what the officers considered to be the biggest target hazard relating to technical rescue in the County. The DVP Yorktown Power Station was noted as being the biggest concern with nine of the sixteen officers. The Western Oil Refinery was second followed by below grade construction, above grade construction (towers, industrial structures, etcetera), and military bases. Since the time of the survey, the oil refinery has shut down operations, idled the refining equipment and laid off most of the workers. The site now functions as a terminal operations industry only.

The author also conducted several interviews to aid in answering this research question. Matt Phillips, Senior Safety Engineer with the DVP Yorktown Power Station stated that he has two major concerns that would result in requiring technical rescue assistance. The first is high angle rescue. Routine maintenance and occasional major repairs to the 490' tall smoke stacks and

the ten story boiler structure places workers in locations and situations that if an injury, medical emergency, or other incident occurred it would likely require specially trained personnel, techniques and equipment to safely access, treat and remove victims. Mr. Phillips stated that there were two incidents recently where the small open sided elevator for the 490' smoke stack that transports 1-2 personnel to the platform located at 260 feet became stuck when a cable got wedged between the guiding track and the rollers of the elevator car. YCFLS's TRT with assistance from Newport News Fire Department's TRT used ropes and mechanical advantage systems to access and lower the workers to the ground. Mr. Phillips stated that his second but most noted concern is confined spaces. At the time of this research, there were numerous *permit required* and *non-permit confined space* entries occurring daily as a result of a major overhaul of several components of the power generation facility. According to Mr. Phillips, an average of 6-8 entries occur daily. To make matters worse, some of these confined space entries are located under water (M. Phillips, personal communication, December 20, 2011).

The Defense Supply Depot has several large in-ground fuel storage tanks that are undergoing major repair work. During the research for this project, a phone interview was held with Mr. Mike Smith of Superior Industrial Maintenance. He stated that his company is repairing four tanks that store fuel. These tanks are 32' deep and 122' in diameter. The tops of the tanks are located six feet below grade and are accessed through one of two six foot wide tubes. The site is inspected and a permit is completed each work day by a marine chemist. Up to nine workers are in the space at a time and work four hours in the morning before breaking for lunch. They then return for another four-hour shift. This work is expected to continue through the end of 2011. (M. Smith, personal communication, November 4, 2010).

According to the York County Environmental and Development Services Division, there are over 1.2 million feet of sanitary sewer line in York County. Over 57 percent of this line is between five and ten feet below grade. Over 25 percent is over ten feet below grade (Appendix B). In fiscal years 2009 and 2010 alone, 15 miles of sanitary sewer line was installed in York County (Appendix C). During an interview with Ellen Medford from the York County Environmental and Development Services Division, Mrs. Medford stated that there are almost 1.3 miles of gravity sewer line in the Queens Lake Subdivision that is 19' or more below grade (E. Medford, personal communication, May 11, 2011).

What is the risk potential for identified technical rescue situations?

To answer this question, the author consulted YCFLS Administrative Technician Tracy Payne to review statistical data relating to past technical rescue incidents in York County. The first topic reviewed was structural collapse. This included vehicles into structures, trees down on structures, and building collapse incidents. Since 2001, there were 74 incidents of calls involving buildings/structures weakened or trees into structures. Of these calls, 11 required shoring operations (T. Payne, personal communications, March 11, 2011). Several company officers noted in their survey answers that risk of a structural collapse during firefighting operations was one of their main concerns.

There were 14 high angle incidents in York County since 2001. Although the review of the reports showed that some of these were minor incidents, such as removing a worker from a roof with a stokes basket and ladder truck, some were actually significant technical rescues requiring climbing an access ladder 260' up a smoke stack, construct hauling/lowering systems, accessing the victim approximately 100' below and lowering him to safety. This particular scenario happened twice in a three-month period at DVP Yorkton Power Station.

Currently, there are 39 cellular tower structures alone in York County with more on the way (Dan Jurgella, personal communication, May 5, 2011). Mr. Josh Lofteim of Global Tower Solutions stated he has crews working on towers in York County or surrounding jurisdictions seven days a week. The typical service crew will have two personnel on the tower and one on the ground. He further stated that there are about twelve tower installation and/or service companies in Tidewater servicing approximately 6,000 towers ranging up to over 12,000 feet in height. Mr. Loftheim also stated that his personnel are highly trained in extreme height rescue. They have even assisted Chesterfield County Fire Department with a rescue of a tower worker within the last year (personal communication, March 15, 2011)

Dominion Virginia Power has many large transmission towers that carry electricity from the Yorktown Power Station through York County to connect with the entire eastern seaboard power grid. Many of these towers are 100-200 feet in elevation (M. Phillips, personal communication, March 15, 2011).

Reports show that the last trench incident in York County occurred in 1999. A worker preparing the foundation for a Wal-Mart store had a medical emergency while down in the area that was excavated for the concrete foundation to be poured. The excavated area was approximately eight feet deep. Prior to technical rescue assets arriving, a ladder was lowered to the victim and he climbed out of the trench to the waiting emergency personnel.

One of the company officers stated in his survey answers, "typically speaking, crew and workers that perform high angle work, and confined space work are aware of the hazards associated with that type of work. When it comes to trench work, anyone with the ability to dig a hole can find themselves in a trench collapse. Many people do not realize that it is not as easy as

just digging themselves out if they are trapped and the associated risks of being trapped over a certain amount of time" (York, 2011).

Although there has not been a documented confined space rescue in York County, the YCFLS TRT participated as part of the Tidewater Regional TRT with a triple fatality confined space incident in the City of Newport News aboard the Aircraft Carrier Harry S. Truman in 1997. A total of eight YCFLS personnel responded to this incident.

York County has several marine ports where ships are docked that could produce an incident such as the one on the Truman. These include Western Refinery, USCG Training Center Yorktown, Yorktown's Riverwalk Landing, U.S. Naval Weapons Station, and the U.S. Naval Supply Center Cheatham Annex. Although the Naval Weapons Station and Naval Supply Center have their own fire departments, YCFLS provides mutual aid to them, and is the closest TRT asset to these facilities.

What are the capabilities of YCFLS related to technical rescue?

To answer this research question, the author focused on the topics of equipment, TRT staffing, standard operating procedures, and training.

Equipment

The author of this research was directly involved in the specifications and purchasing of the technical rescue equipment currently carried by YCFLS TRT and, therefore, has direct knowledge of the procurement process to obtain the equipment. Great lengths were taken at the time of purchase to ensure the equipment met current NFPA, OSHA, and other applicable standards and practices. Consultation was also made with mutual aid and regional TRT jurisdictions to ensure that the equipment was interoperable and inter-connectable where needed.

TRT equipment is checked daily. Powered equipment is run once a week. Manufacturer's maintenance recommendations and service schedules are strictly followed as well.

Annex G of NFPA 1006 (2008), Standard for Technical Rescuer Professional Qualifications, contains a list of sample tool kits for use by technical rescue teams for specialty rescue incidents. With the exception of a line gun and an electrical energy detector, YCFLS equipment cache includes all recommended equipment. A copy of the YCFLS TRT equipment cache can be found in Appendix D.

The YCFLS equipment cache has been strategically placed onto two apparatus. The primary, or first needed equipment, is located on the heavy-rescue-engine. The remaining equipment is located on the 46' Urban Search and Rescue Trailer and tow vehicle. This equipment arrangement provides the means for a direct impact by the first arriving TRT asset (heavy-rescue-engine) and personnel until the arrival of the rest of the equipment and personnel (J. Payne, personal communication, March 20, 2011).

Virginia Beach Fire Department Battalion Chief Daryl Funaiock stated that the Tidewater area is very well equipped for technical rescue incidents, not just because of the robust amount of individual jurisdictions equipment, but because of the VA-TF 2 equipment being readily deployable at a moment's notice (D. Funaiock, personal communication, January 28, 2011). Mutual aid agreements between all of the Peninsula jurisdictions provide the ability to rapidly deploy additional assets to an incident in York County when needed (R. Long, personal communication, January 23, 2011).

TRT Staffing

Minimum qualifications to be considered part of TRT staffing is VDFP Rope II, VDFP Confined Space Technician, VDFP Trench Rescue Technician, and completion of a FEMA

sanctioned Structural Collapse Rescue Technician course. Fire Station Four is a single engine company station that has five personnel assigned to each shift with four personnel being the minimum. This staffing would provide a minimum of two personnel on the engine and two personnel on the advanced life support medic unit (D. Worley, personal communication, March 5, 2011). There is not a minimum requirement for the number of personnel on duty at this station to be TRT qualified, however, a review of staffing records showed that on average, between the three shifts, four TRT qualified personnel were on duty at Fire Station Four during calendar year 2010. Additionally, there are qualified personnel at other stations. If needed, these personnel could be called upon to respond to a TRT incident. Of these additional personnel, one is on A shift, two are on B shift, and three are on C shift. There are four administrative staff personnel that are part of the TRT. These personnel are the Battalion Chief of Technical Services and Special Operations (TSSO), two TSSO Captains, and the Captain/Deputy Coordinator of Emergency Management.

The author reviewed each day of calendar year 2010 and found that the average daily staffing of TRT personnel, not including the administrative staff, was 4.45 for A shift, 5.15 for B shift and 4.30 for C shift. The author contacted the three other departments on the Peninsula with TRTs (Hampton, Newport News, James City) to determine what their minimum TRT staffing was per shift. Special Operations Chief Robert Lee of the Newport News Fire Department states that they have a minimum of three personnel on each of their two rescue companies for a total of six personnel per shift (personal communication, March 12, 2011). According to Captain Scott from James City County Fire Department, they do not have a minimum staffing, but try to ensure that they have at least one TRT person on the rescue company per shift (M. Scott, personal communication, March 12, 2011). The Hampton Fire

Department has six personnel assigned to their TRT per shift, but does not have a minimum staffing requirement (W. L. Johnson, personal communication, March 12, 2011).

Standard Operating Procedures

NFPA 1670-4.1.1 (2009) states that the *authority having jurisdiction* shall establish written standard operating procedures (SOPs) consistent with the operational level (*awareness, operations, and/or technician level*) of each technical search and rescue capability. A review of the YCFLS Standard Operating Procedures Manual revealed that there are no policies for any of the TRT capabilities. According to YCFLS Deputy Chief of Operations Michael Player, TRT SOPs have been produced and will soon be going through the editing and approval process by the SOP committee and the Fire Chief (M. Player, personal communication, January 22, 2011).

Training

According to the survey, two of the sixteen respondents are not familiar with the TRT equipment and capabilities. Captain James Rhodes II, TRT Coordinator and Training Officer for YCFLS, states that specialty team equipment and capability training has been conducted for all shifts at all stations for each of the special teams in the past. This training was provided to make all personnel aware of the resources that are available to them for mitigating specialized emergency situations (J. Rhodes, personal communication, February 2, 2011). Only one of the company officers indicated that they do not have the knowledge, skills or ability to recognize the need for and could initiate a response for a technical rescue incident.

The survey also showed that 37.5 percent of the company officers do not feel that YCFLS and the participating regional and mutual aid teams are prepared to deal with a technical rescue emergency. The reasons given were inadequate department and regional training being provided and inability to have enough TRT personnel on scene in a timely manner.

As a whole, YCFLS has only a small amount of personnel trained in TRT disciplines. Figure 2 shows that only 11 percent of YCFLS personnel are trained in structural collapse awareness or above. Additionally, less than one third of the department is trained at the awareness level or above in confined space and trench rescue, and less than half of the personnel are trained in rope rescue awareness.

Table 1: TRT Training Certifications for YCFLS Personnel

	Trench Rescue			Confined Space Rescue			Rope Rescue			Structural Collapse	
	Awareness	Operations	Technician	Awareness	Operations	Technician	Awareness	Operations	Technician	Awareness	Technician
Battalion Chief	0	0	2	0	2	1	0	0	3	0	2
Captain	0	1	2	0	3	2	2	0	4	2	3
Lieutenant	0	2	3	0	5	3	2	2	6	2	3
Master Firefighter	0	0	0	1	0	0	2	0	0	1	0
Senior Firefighter	6	2	9	2	8	6	14	1	12	0	6
Firefighter	21	4	3	20	2	2	33	4	2	0	1
Total Personnel	27	9	19	23	20	14	53	7	27	5	15
Percent of Department*	15%	5%	11%	13%	11%	8%	29%	4%	15%	3%	8%
Awareness or Above per Discipline*	31%			32%			48%			11%	

* Figured on 180 personnel and rounded to nearest whole number

NFPA 1670-4.1.10.2 (2009) states "The AHJ shall provide for the continuing education necessary to maintain all requirements of the organization's identified level of capability."

Additionally, section 4.1.10.3 states "An annual performance evaluation of the organization based on requirements of this standard shall be performed."

NFPA 1670 Annex A (2009) further explains Section 4.1.10.2 as follows:

Organizations should provide ongoing training commensurate with proficiency to the identified operational level of capability in each applicable technical search

and rescue discipline. The amount and frequency of this continuing education required is commonly based on criteria such as the current competency and aptitude of the team, fiscal constraints, and time constraints. However, the standard provides that the AHJ utilized performance-based evaluation as the primary basis for the amount and frequency of training required to meet this standard. Organizations demonstrating poor performance during evaluation imply a need for greater amount and/or frequency of training.

When the YCFLS TRT originally began, training was not an issue. Personnel attended regional training at least twice a year, as well as quarterly team training in the County (J. Payne, personal communication, January 12, 2011). When joining the Tidewater Regional TRT the Fire Chiefs of the participating jurisdictions signed an agreement that stated “personnel will be made available for 72 hours per year to meet the continuing education requirements of the regional team” (Appendix F). Unfortunately, the declined economy has reduced overtime funding to a level that currently does not permit this type of training (J. Rhodes, personal communications, March 21, 2011). According to YCFLS TRT Lieutenant Andrew Waters all special teams' training has had to be more inventive and conducted on duty as much as possible (personal communication, April 1, 2011).

YCFLS requires a minimum of three hours of TRT training per month. The topics and curriculum for these monthly training sessions are prepared by the YCFLS training staff and sent out as part of the monthly training package. Figure 3 shows the minimum TRT required training for calendar year 2010. A review of the calendar year 2010 training records revealed that the minimum hours were greatly exceeded. Over 250 course and drill hours were conducted during calendar year 2010 (York, 2011).

Table 2: 2009 Monthly Technical Rescue Training

Month	Hours	Topic
January	3	Trench/Excavations
February	3	Breaking, Breaching - Cutting and Burning
March	3	Breaking and Breaching - Saws
April	3	Confined Space Atmospheres
May	3	Boat Operations
June	3	Ropes and Knots
July	3	Confined Space Emergencies
August	3	Trench/Excavations and Soils
September	3	Building Collapse, part 1
October	3	Building Collapse, part 2
November	3	Trench, Vacuum Truck Operations
December	3	Chemical Assisted Suicide Incidents

What mutual aid and/or other resources are available to YCFLS to assist in the mitigation of identified potential technical rescue incidents?

A review of YCFLS mutual aid documents revealed that mutual aid is available by all jurisdictions that border York County for normal fire and rescue response. Additionally, an agreement is also in place for responses from departments of the Peninsula Regional Technical Rescue Team (Appendix E) and the Tidewater Technical Rescue Team (Appendix F).

The Peninsula Regional Technical Rescue Team was originally made up of the Hampton, Newport News, James City, Williamsburg, Poquoson, Fort Eustis (U.S. Army Transportation Center) and YCFLS teams. In the last few years, Fort Eustis and Poquoson have removed themselves from the team. The remaining teams are also part of the Tidewater Technical Rescue Team which adds Virginia Beach, Norfolk, Chesapeake, Portsmouth, and Navy Region Hampton Roads. The Tidewater Regional TRT maintains a list of participating departments' TRT capabilities for use as a quick reference for departments requesting assistance (Appendix G).

According to this list, the nine participating Tidewater TRT departments have a total of 66 TRT personnel on duty every day. The Tidewater Regional TRT also serves as the FEMA Urban Search and Rescue Team VA-TF2 by adding non-fire and rescue jurisdictional personnel along with civilian doctors, engineers, canine's and their handlers. VA-TF2's website lists their capabilities as:

Physical search and rescue operations in damaged or collapsed structures. Emergency medical care for entrapped victims, task force members and search canines.

Reconnaissance to determine damage and provide damage assessments for local, state and federal officials. Survey and evaluate hazardous materials situations. Structural and hazard evaluations of buildings needed for immediate occupancy to support disaster relief operations. Stabilization of damaged structures that include shoring and cribbing operations. Coordination of the Federal effort with resources to locate, extricate and provide initial medical treatment to victims trapped in collapsed structures resulting from a disaster (Virginia, 2011).

The Virginia Department of Fire Programs (2011) has identified seven TRTs in the Commonwealth that will respond when needed to assist with a TRT incident. One of these teams is located in each of the seven regions of the state (Appendix H). Any jurisdiction can request one of these assets by contacting the Virginia Emergency Operations Center. York County is located in Area 5 and would get its response from the Tidewater Regional TRT.

The next level of response would be from the FEMA Urban Search and Rescue System. This request would also be made to the Virginia Emergency Operations Center which would then make a request to FEMA (R. Long, personal communications, March 11, 2011).

Research also revealed that both Newport News and YCFLS have a comprehensive resource book that contains information that may be needed for mitigating incidents. Information in these books included available equipment, material and supplies along with contact names and numbers for personnel that could respond night or day to provide materials and/or services such as lumber, hardware, crane and rigging, heavy equipment, vacuum trucks.

Discussion

Question number 1: *What types of technical rescue situations is YCFLS susceptible to?*

The company officers have indicated that there are numerous issues affecting each of the six fire station districts. The results of the survey and review of incident reports showed that YCFLS is very much susceptible to High Angle, Confined Space, Trench and Structural Collapse incidents. What was found by this author to be most disturbing was that structural collapse was viewed by 100 percent of the engine company officers as the number one technical rescue hazard faced by YCLFS; however, only 11 percent of YCFLS personnel have awareness level or higher training in this topic.

Question number 2: *What is the risk potential for identified technical rescue situations?*

Research showed that York County's infrastructure such as underground utilities, cellular and other communications, and power distribution towers, etcetera, create a high potential of an incident to occur requiring high angle or trench rescue capability. The amount of ongoing confined space work through the entire 2011 year at both DVP Yorktown Power Station and the Defense Fuel Supply Depot alone is enough to warrant concern of a confined space incident to occur. However, the statistics found along with the opinions of the officers responding to the survey show that the current most susceptible type of technical rescue call is for structural

collapse due to vehicles colliding into them, trees or other debris falling on them, or from a weakened structure due to fire.

Question number 3: *What are the capabilities of YCFLS related to technical rescue?*

YCFLS is very well equipped to handle technical rescue incidents. The equipment is packaged and carried on vehicles in a very systematic approach. The staffing of the team is in line with the other Tidewater jurisdictions. The problem noted during this research is the non-existence of SOPs or other documentation to provide structure and guidance to not just the TRT, but to the first arriving crews at an incident that may involve a technical rescue situation. Another issue found is that the YCFLS does not conduct annual assessments on the TRT as required by NFPA 1670 4.1.10.3.

Although YCFLS provides specialized training guidance to the special teams and requires that this training be conducted on duty, so as to not incur overtime, it should not take the place of the adequate training needed to maintain proficient knowledge, skills, and abilities relating to this very high risk, very low frequency responsibility of the emergency service. The vast reduction in regional team training will likely cause a lack of teamwork and continuity, equipment familiarization, and overall organization during what will likely be a very tough and demanding incident.

All department personnel need to be more educated on the capabilities and resources that the TRT can provide. Additionally, personnel need to understand the response matrix for TRT incidents and that it will take more than YCFLS to handle most of these types of situations.

Question number 4: *What mutual aid and/or other resources are available to YCFLS to assist in the mitigation of identified potential technical rescue incidents?*

YCFLS is extremely fortunate to have an excellent mutual aid relationship with all Tidewater jurisdictions. It was realized by these jurisdictions years ago that no one department could likely handle a technical rescue incident of any significance alone. However, with the combined efforts of the Peninsula and Tidewater area departments, a highly trained and equipped group of personnel could readily be assembled to mitigate almost any incident. With these agreements and capabilities in place, YCFLS has the range of ability to call in just one asset from another department, respond the Peninsula teams or activating the entire Tidewater regional team of which would ultimately generate an estimated 66 highly trained on-duty personnel and a huge assortment of specialized equipment.

Should the response from the Tidewater teams not be sufficient to handle the situation, additional teams may be requested from the State Emergency Operations Center, or the FEMA Urban Search and Rescue system for assistance.

Recommendations

The research for this project has demonstrated that YCFLS definitely has a significant risk of incurring an incident that will require technical rescue response assets and personnel. However, in order to ensure that YCFLS can effectively and safely mitigate these incidents several capability issues need to be addressed.

The following recommendations are being made for consideration by YCFLS:

1. Provide a minimum of awareness level training to all personnel in structural collapse, trench, high angle and confined space rescue.
2. Develop a way to reinstitute regional training using available mutual aid jurisdictions, staff personnel or other means to backfill personnel as needed.

3. Assemble a group of TRT personnel to continue to develop SOP's relevant to TRT responses and activities for not just the TRT, but for standard engine, ladder, rescue and medic companies as well.
4. Institute an annual TRT evaluation process using officers and technical experts from the Tidewater Regional TRT to conduct and evaluate the team.
5. Establish a relationship and work with the tower construction and maintenance industry in our area to become familiar with their activities and equipment in an effort to be better prepared for a tower rescue event.
6. Continue to visit and monitor the known sites where specialized work is taking place that may involve the need for technical rescue assets.
7. Continue to participate in the regional concept and the management of the regional teams in an effort to share resources, knowledge and expertise.

In summary, this applied research project provides YCFLS with a comprehensive risk assessment of technical rescue incident potential in York County and a capability study to determine the ability to effectively manage them. The recommendations provided by this author are made in an effort to bring YCFLS's TRT into NFPA compliance, to keep YCFLS's emergency responders abreast of the potential technical rescue situations that could occur in the County, and to be prepared to mitigate them if and when they occur.

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Appendix A.

1. What fire district are you typically assigned?

- Station 1
- Station 2
- Station 3
- Station 4
- Station 5
- Station 6

2. How many years have you been with the York County Department of Fire and Life Safety?

- Less than 10
- 11 - 15
- 16 - 20
- 21 - 25
- Greater than 25

3. What technical rescue certifications do you currently hold (check all that apply):

- Rope Rescue 1
- Rope Rescue 2
- Rope Rescue 3
- Trench Rescue Awareness
- Trench Rescue Operations (old standard HTR Trench Certification)
- Trench Rescue Technician
- Confined Space Rescue Awareness
- Confined Space Rescue Operations (old standard HTR Confined Space

Certification)

- Confined Space Rescue Technician
- Structural Collapse Rescue Awareness
- Structural Collapse Rescue Technician
- I currently do not hold any technical rescue certifications.

4. In your opinion, what technical rescue situations is your district susceptible to? (check all that apply)

- High Angle (communications/utility tower or pole, window washers, tall structures, etc.)
- Trench (utility installation/work, building construction/footings, etc.)
- Confined Space (fuel tanks, shipboard enclosures, industrial spaces, etc.)
- Structural Collapse (structural fires, damage from vehicles, construction incidents, etc.)

5. In your opinion, which one of the technical rescue incidents below is your district most susceptible to?

- High Angle
- Trench
- Confined Space
- Structural Collapse

6. In your opinion, what is the biggest target hazard relating to technical rescue (high angle, trench, confined space, or structural collapse) that our department faces.

- Virginia Power Station
- Western Refinery
- Military Bases
- Below Grade Construction (trenches, excavations, etc.)

- Above Grade Construction (towers, large industrial structures. etc.)
- Other

7. In your own words, please briefly explain your answer to question #4 above.



8. Are you familiar with the equipment and capabilities of our technical rescue team?

- Yes
- No

9. Do you feel that as first arriving officer at an emergency incident that you have the knowledge, skills and ability to recognize the need for and initiate a response for technical rescue assistance?

- Yes
- No

10. In your opinion, utilizing its current capabilities and those of participating regional and mutual aid teams, is York County Fire and Life Safety prepared to deal with technical rescue emergencies?

- Yes
- No (see below)

If you answered "No" above, please explain:



Appendix B.

COUNTY OF YORK - SANITARY SEWER DATA

Infrastructure	FY2008	FY2009	FY2010
Pump/Lift Stations	64	68	68
Vacuum Stations	7	7	7
Grinder Pumps	65	75	76
Force Main, Miles	36	39	46
Gravity Sanitary Sewer Mainline, Miles	224	227	229
Manholes	5,860	5,914	5,952
Vacuum Sanitary Sewer, Miles	63	63	63
Vacuum Vaults, #	1,175	1,222	1,228

Appendix C.

**YORK COUNTY
GRAVITY SANITARY SEWER
DEPTH SUMMARY**

	<u>LENGTH IN FT.</u>	<u>% OF TOTAL</u>
DEPTH UNKNOWN	36,307.56	2.99%
DEPTH <= 5FT	169,298.12	13.93%
DEPTH >5FT <=10	698,856.85	57.50%
DEPTH >10FT <=20FT	304,203.91	25.03%
DEPTH >20FT <=30FT	6,834.39	0.56%
 TOTAL FT.	 1,215,500.83	

Appendix D.

YCFLS TRT Equipment Cache

As of: January 2011

ROPE RESCUE EQUIPMENT			
Item	Quant.	Description	Comments
8 Plate, Alum.	13	8 plate with ears	
8 Plate, Steel	4	Stainless Steel	
Ascenders	3 Pair	Gibbs	
Ascenders	6 Pairs	CMI Ultrascenders	
Basket, Stokes	1	Stainless Steel, 2 piece	Basket, complete Stokes rigging gear for patient and attendant
Carabiners	Various	Sizes , large and x-large	Heat Treated Steel
Carpet	Various		Edge Protection
Cordage	Various	Assorted lengths	8mm Dia
Cordage	Various	Assorted lengths	7mm Dia
Etrier	2		
Halfback	1	LSP	adjustable lifting harness, 3 carabiners
Harnesses, Chest	8	CMC	For use w/Rappel harnesses
Harnesses, Rappel	7	CMC	2 X-large, 3 large, 2 medium
Haul-Safe	1	RSI	1/2"x200' (4 or 5:1) complete
O-Rings, Steel	6		
Plate, Rigging	3	CMC	
Plate, Rigging	2	CMC, Alum.	
Pulleys	8	2" single	
Pulleys	11	2" single with becket	
Pulleys	12	3" Single	
Pulleys	10	4" Single	
Pulleys	10	4" Single with becket	
Pulleys	2	Knot passing	
Rack, Rappel	4	Stainless Steel	
Rack, Rappel	3	Alum. w/ twist	
Rack, Rigging	4	Alum.	
Roller, Edge	2	RSI	
Roller, Roof	1	RSI	
Rope, Life-safety	7	PMI, static/kern	1/2" x 300', misc. colors
Rope, Life-safety	10	PMI, static/kern	1/2" x 200', misc. colors
Rope, Life-safety	1	PMI, static/kern	1/2" x 600', misc. colors
Rope, Life-safety	1	PMI, static/kern	1/2" x 150', misc. colors
Rope, Life-safety	1	PMI, static/kern	1/2" x 190', misc. colors
Rope, Rigging	Various	Assorted lengths	1/2" Dia. Lifeline
Strap, Rigging	8	Premade	2" Webbing
Strap, Rigging	3	CMC	7' lg
Strap, Rigging	4	CMC	10' lg
Swivel, Steel	4	RSI	
Ultrascenders	6 Pairs	CMC	
Webbing	Various	Assorted widths and lengths	

YCFLS TRT Equipment Cache

As of: January 2011

STRUCTURAL COLLAPSE RESCUE EQUIPMENT			
Item	Quant.	Description	Comments
Airshore, 12" Base Plate	8	ART - BP12	
Airshore, 12" Extension	6	ART - E12	
Airshore, 23 Degree Swivel	18	ART - S23	
Airshore, 24" Extension	6	ART - E24	
Airshore, 45 Degree Pivot	10	ART - P45	
Airshore, 45 Degree/Static Clevis	4	ART - 45SC	
Airshore, 48" Extension	4	ART - E48	
Airshore, 5" Raker Rail	4	ART - RR5	
Airshore, 6" Base Plate	6	ART - BP6	
Airshore, 6" C-Grip	6	ART - CG6	
Airshore, 60 Degree Pivot	4	ART - P60	
Airshore, 72" Extension	4	ART - E72	
Airshore, 8" C-Grip	6	ART - CG8	
Airshore, A-Frame Kit	1	ART - AFK	
Airshore, Base Plate Bracket	4	ART - BP12BR	
Airshore, Chain Wedge	2	ART - CW	
Airshore, Dual HP Air Supply	2	ART - 050R	
Airshore, Flat Base	18	ART - FB	
Airshore, Gin Pole Lid	1	ART - GPL	
Airshore, Gin Pole Pivot w/2" hitch	1	ART - GPP	
Airshore, HD Rails, 2 - 6'	4	ART - HDR6	
Airshore, HD Waler Connector	4	ART - HDCON	
Airshore, L-Grip	10	ART - LG	
Airshore, LD Raker Rail Adapter	2	ART - LDCON	
Airshore, Lowering Hook	4	ART - LH	
Airshore, Picket	12	ART - PK	
Airshore, Shore 21" to 28"	6	ART - A	
Airshore, Shore 26" to 37"	7	ART - B	
Airshore, Shore 33" to 49"	7	ART - C	
Airshore, Shore 54" to 84"	6	ART - E4.5-7	
Airshore, Shore 63" to 97"	4	ART - E	
Airshore, Shore 84" to 132"	6	ART - 7-11	
Airshore, Raker Rail Adapter	4	ART - RA	
Airshore, Raker Rail Nailer	8	ART - RRN	
Airshore, Ratchet Strap	4	ART - RS	
Airshore, Ratchet Strap Ext.	2	ART - RSE	
Airshore, Rigid Base	12	ART - RB	
Airshore, Set of 2 - 18" Rails	6	ART - R18	
Airshore, Static Clevis	6	ART - SC	
Airshore, Tripod Head	4	ART - TH	
Airshore, Tripod Hose	2	AIR - THA	
Airshore, V-Block	4	ART - VB	
All-thread	4	1/2" all thread 3' long	
Angle Base	2	Paratech	T - Plate
Base Plug	1	Paratech	3"
Battery	5		For Paslode gas nail gun
Belts, Tool	6		
Blades, Saw	Various	For cut off saws	RMC, composite steel cutting, and composite masonry cutting
Bolting Kit	Various		Bolts, washers, anchors, etc.
Can, Pressurized H2O	2	Stihl, for cut-off saws	
Carpenter Pencils	1 case		
Carpenter Squares	2	24"	
Chalk	Various		Sidewalk chalk
Chalk Lines	2	Speedline	3 chalk refills
Channel Base	2	Paratech	4"
Chaps, Chainsaw	1	Stihl	
Chisel, Hand Held	1		Masonry
Compressor, Air	1	Dewalt 120 VAC	2hp, 4 gallon
Cone Base	2	Paratech	with 90 degree steel cone
Controller	1	Paratech	Dual Strut
Crow Bar	2	2 - 38"	Gorilla bar

YCFLS TRT Equipment Cache

As of: January 2011

Item	Quant.	Description	Comments
Crow Bars	2	2 - 12"	Gorilla bar
Cut-off Tool, Pneumatic	1	Porter Cable, Pneumatic	with various attachments and discs
Drill	1	Dewalt 120 VAC, 3/8"	Drill, misc. bits, case
Drill	1	Drill 120 AC	Makita 3/8 electric drill
Drill, Hammer	1	Dewalt 24 volt	Drill, 2 batt, 1 batt. eliminator, misc. bits, (located w/recip. Saw)
Drill, Hammer	1	Stanley model HD08	Hydraulic, 7/8"
Drill, Pneumatic	1	Porter Cable	Angle type, 3/8"
Drill, Pneumatic	1	Porter Cable	1/2", with side handle
Ellis Clamp	5 pair	4x4	
Ellis Jack	1	4x4	
Etrier	2		
Fuel Cells	20	Paslode	For gas nail gun
Hammer	6		2 - 24oz framing, 4 16oz claw
Hammer, Air	1 kit	Quick-Kut	with various bits
Hammer, Breaker	1	Bosch 120 VAC	Breaker (37 Ft-Lbs), moil and narrow chisels, cart
Hammer, Breaker	1	Stanley model BR67	Hydraulic, 70lb. with mult. bits
Hammer, Breaker	1	Stanley model BR37	Hydraulic, 40lb. with mult. bits
Hammer, Chipper	1	Milwaukee	Hammer (8.6 Ft-Lbs), misc. chisels, case
Hammer, Demolition	1	Milwaukee	Hammer (18.5 Ft-Lbs), misc. chisels, and rebar driver, case
Hammer, Pneumatic	1	Devilbiss Excell	with various bits/chisels
Hammer, Rotary	1	Milwaukee	Rotary hammer, misc. bits and chisels, case
Hinged Base	2	Paratech	6"
Horse, Saw	4		
Hose, Hydraulic	2 sets	Stanley, 50'	
Level	2	10"	
Level	2	18"	
Level	2	24"	
Level	2	48"	with case
Lumber	12	2"x4"x12'	
Lumber	8	6"x6"x12'	
Lumber	8	4"x4"x12'	
Lumber	10	2"x10"x12'	
Lumber	10	2"x6"x12'	
Nail gun	1	HILTI, model DXA41	Cartridges and nails
Nail gun	2	Paslode Impulse, Gas	
Nail gun	2	Paslode model F3505	Pneumatic
Nail pullers	6		
Nails	50 lb	8d	
Nails	50 lb	16d	
Nails	50 lb	16dd	
Nails	6 case	8d (Paslode)	
Nails	8 case	16d(Paslode)	
Paint, Marking	4		
Plywood	8	4'x8'x3/4"	
Plywood	12	4'x8'x1/2"	
Power Unit, Hydraulic	1	Stanley	For large pumps, breakers, chain saw, cut-off saw, etc.
Power Unit, Hydraulic	1	Enerpac	10 Ton (for use with Paratech equipment)
Pry Bars	2	12"	
Pry Bars	2	18"	
Pry Bars	2	36"	
Pry Bars	2	6'	
Regulator	1	Paratech	High Pressure
Rulers, folding	2	6'	
Saw, Circular	1	Dewalt 24 volt	Saw, 2 batt., 1batt. eliminator, extra blades, case, charger
Saw, Circular	2	Milwaukee 120 VAC, 7 1/4"	Saw, extra blades, wrench, case
Saw, Circular	2	Milwaukee 120 VAC, 10 1/4"	Saw, extra blades, wrench, case
Saw, Cut-off	1	Dewalt 120 VAC	Saw, 14" masonry comp. blade, spare masonry and steel blades
Saw, Cut-off	1	Partner, K1200	Saw with 14" comp. blade, wet kit, extra diamond RCM wet blade
Saw, Cut-off	1	Stihl, model 760	Saw with 16" diamond RMC wet blade
Saw, Cut-off	1	Stihl, model 460	Saw with 14" composite blade for steel cutting
Saw, Cut-off	1	Stihl, model 400	Saw with 14" diamond RMC wet blade
Saw, Cut-off	1	Dewalt, electric	Saw with 14" composite blade for steel cutting

YCFLS TRT Equipment Cache

As of: January 2011

Item	Quant.	Description	Comments
Saw, Cut-off	1	Stanley model CO23	Hydraulic, 14" diamond RMC wet blade
Saw, Hand	2	Crosscut	
Saw, Miter	1	Dewalt 120 VAC, 12" Compound	Miter saw
Saw, Multi	2		extra hack saw blades
Saw, Reciprocating	2	Dewalt 120 VAC	Saw, extra blades, wrench, case
Saw, Reciprocating, cordless	1	Dewalt 24 volt	Saw, 1 batt, extra blades, charger, case (located w/hammer drill)
Screws	Various		Sheet metal and drywall
Siamese	1		1 1/2" to (2) garden hoses
Square, Speed	5		3 - 7"lg, 2 - 12"lg
Strut, Rigid	1	Paratech	1"
Strut, Rigid	1	Paratech	3"
Strut, Rigid	1	Paratech	5"
Tape, Measuring	6	25'	
Tape, Measuring	2	100'	
Tools, Hand	2 sets	Various hand tools w/case	
Torch, Chemtane	1	Uses Chemtane/O2	Regulator, torch, protective gloves and jacket, eye pro.
Torch, Exothermic	1	w/100 rods	

CONFINED SPACE RESCUE EQUIPMENT			
Item	Quant.	Description	Comments
Adapter, Vent	1	90 deg. Elbow	
Adapter, Vent	1		Sleeve
Air Supply, SABA	1	Airsystems MACK III	
Air Supply, SABA / air tools	1	Airsystems Tech Rescue Cart	
Atmospheric Monitor	2	QueRae II	
Backboard	1	Miller	Complete with straps
Chain	1	33"	Grade 70 for ART tripod
Con-Space	1	Complete Kit for 6 entry, 2 att's.	speaker boxes, various add'l cables, headsets and adaptors
Couplings, Schrader	24 pair		for SABA system to adapt to Western Refinery or Naval Base
Fan, Electric	1	Air System AC	2 speed 750/1570 cfm
Fan, Electric	1	Air System DC	
Fan, Exhaust	1	16"	Fan, Hanger and extension
Fan, Exhaust	1	24"	Fan, Hanger and extension
Hose, Air	4	3/8"	50' x 3/8" sections with standard couplers
Hose, SABA	6	MSA	200' w/Hansen fittings, Con-space line, 8mm cord incl. in umbilical
Hose, SABA	6	MSA	50' w/ Hansen fittings, Con-space line, 8mm cord incl. in umbilical
Hose, Ventilation	1	5' lg	
Hose, Ventilation	1	15' lg	
Hose, Ventilation	1	25' lg	
Jumpsuits, Nomex	5		3 small, 1 large, 1 x-large
Lightsticks	4 cases	Cylume	5 minute high intensity
SABA Units	6	MSA	Harness, regulator, mask, 10 min. bottle and PAL
Tripod	1	Protecta, 7-10'	Tripod, leg support chains adjustable 7' - 10'
Tripod	1	Skedco, 9'	Tripod, leg support chains adjustable 7' - 10'
Vent, Saddle	1	Air System	Saddle vent and anchor
Winch, Tripod	1	DBI SALA	120' SS Cable
Winch, Tripod and general	1	Skyhook	for use with 1/2" and 5/8" rope

YCFLS TRT Equipment Cache

As of: January 2011

VEHICLE RESCUE EQUIPMENT			
Item	Quant.	Description	Comments
Air Supply	1	Back-Pack	For pneumatic tools, adjustable regulator, coiled hose
Assorted Pine Cribbing	Various		
Air Supply	1	Back-Pack	For pneumatic tools, adjustable regulator, coiled hose
Assorted Pine Cribbing	Various		
Chain	4	Various lengths	For various stabilizing and anchoring tasks
Combtool	1	Genesis Hand Vario	Spreader/cutter combination tool
Cutter, Hydraulic	1	Genesis C-165	
Cutter, Hydraulic	1	Genesis Mini Cutter	
Hose, Hydraulic	2 sets	Genesis, 25'	
Hose, Hydraulic	2	Genesis, 100' on reels	Integrated Equipment on YC Engine 4:
Power Hawk Backpack	1		
Power Hawk Combi-tool Arms	1		
Power Hawk Cutter Arms	1		
Power Hawk Extension Cable	1		
Power Hawk Light	1		
Power Hawk Motor / Actuator	1		
Power Hawk Pwr Unit & Controller	1		
Power Hawk Ram	1		
Power Hawk Spreader Arms	1		
Power Unit, Hydraulic	1	Port-A-Power	Power unit, spreaders, ram w/extensions and adapters
Power Unit, Hydraulic	1	Genesis	Integrated Equipment on YC Engine 4:
Power Unit, Hydraulic	1	Genesis M1X with Honda Engine	Portable
Power Unit, Hydraulic	1	Port-A-Power	Power unit, spreaders, ram w/extensions and adapters
Power Unit, Hydraulic	1	Genesis	Integrated Equipment on YC Engine 4:
Power Unit, Hydraulic	1	Genesis M1X with Honda Engine	Portable
Strap, Ratchet	4		2" x 15', 5000lb rating

TRENCH RESCUE EQUIPMENT			
Item	Quant.	Description	Comments
Hose, Discharge	2	25'	For trash pump
Hose, Garden	7	3 - 25' lg, 4 - 50' lg	
Hose, Rigid Intake	2	10'	For trash pump
Pump, Manhole/Vault	1	Stanley model SM23	Hydraulic, 375gpm, can pump up to 3/8" solids
Pump, Submersible	2	1/2 HP Geyser IV utility pump	Electric
Pump, Trash	1	IPT self priming trash pump	3" discharge, 1.5" solids @ 18000 GPH. Honda engine
Pump, Trash	1	Stanley model TP04	Hydraulic, 4" discharge, 800gpm
Shovel, Coal	1		
Shovel, Flat	4		
Shovel, Folding	4		
Shovel, Spade	2		
Shurform Panels	4	2' x 2' x 3/4" w/o strongbacks	
Shurform Panels	2	4' x 4' x 3/4" w/o strongbacks	
Shurform Panels	8	4' x 8' x 3/4" w/strongbacks	
Strainer Basket	2		For trash pump
Trowels	4		Garden trowels

YCFLS TRT Equipment Cache

As of: January 2011

MISCELLANEOUS RESCUE EQUIPMENT AND SUPPLIES			
Item	Quant.	Description	Comments
Battery, Deep Cycle	2		
Blanket	6	Wool	
BLS Kit	1		
Battery, Deep Cycle	2		
Blanket	6	Wool	
BLS Kit	1		
Can, Gas	1	Gasoline for 4 cycle equip	
Can, Gas/Oil Mix	3	Gas/oil mix for 2 cycle equip	
Cartridges, Respirator	6 pair	P-100	
Chargers, Battery	2	Dewalt	For 24 volt DC tools
Chargers, Battery	4	Paslode	For nail gun
Coveralls	2 cases	Tyvex	
Chargers, Battery	2	Dewalt	For 24 volt DC tools
Chargers, Battery	4	Paslode	For nail gun
Coveralls	2 cases	Tyvex	
Ear Protection	100	Bilsom ear plugs	
Electrical Cords	4	50'	with 20 amp twist plugs
Electrical Cords	2	100'	with 20 amp twist plugs
Electrical Cords	6	50'	with house current plugs
Electrical Cords	2	100'	with house current plugs
Electrical Junction Box	2		
Generator	1	Honda EB3500, 3.5 KW	
Generator	1	Hydraulic, 30 KW	Integrated Equipment on YC Engine 4:
Generator	1	Onan, 7 KW	Integrated Equipment on YC Squad 4:
Grinder, Angle	1	Dewalt 120 VAC	Grinder, misc wheels, wrenches, case
Hacksaw	2	with extra blades	
Hammer, Sledge	2	8 lb	
Hammer, Sledge	1	12 lb	
Harnesses, Radio	4		2 medium, 2 small
Impact Wrench, Pneumatic	1	Porter Cable	Impact wrench, 1/2", includes SAE and metric impact sockets
Ladder	1	14' roof	Integrated Equipment on YC Engine 4:
Ladder	1	24' extension	Integrated Equipment on YC Engine 4:
Ladder	1	10' attic	Integrated Equipment on YC Engine 4:
Ladder	1	6' Folding	
Ladder, Little Giant	1		Integrated Equipment on YC Engine 4:
Light Tower	1	6000 watts Wilbert	Integrated Equipment on YC Engine 4:
Lights, Floor type	2		
Lights, Tripod	2	750 watts	Integrated Equipment on YC Engine 4:
Maul	2	10lb , 8lb	
Nozzles, Garden Hose	2		
Pads, Elbow	4 pair		
Pads, Knee	4 pair		
Picketts	6	36" lg	
Plastic, Sheeting	2 roll	10'x100'	6mil
Rakes	2	Steel tine	
Respirators	4	MSA Comfo-Classic	Medium
Saw, Chain	2	Remington 120 VAC	Saw with 16" bar, spare chains, tool kit
Saw, Chain	1	Stihl, model 044	Saw with 20" bar, bar/chain cover, spare chains, tool kit
Saw, Chain	1	Stihl, model 046	Saw with 24" bar, bar/chain cover, spare chains, tool kit
Saw, Chain	1	Stanley, model DS06	Saw with 12" bar, diamond chain, wet kit installed
Stapler, Hand	1	Slap type	with misc. staples
Strap, Axle	4		2" x 16"
Tamper	1	Stanley model TA55	Hydraulic, backfill type
Tape, Duct	Various		
Tape, Marking	2		
Tarps	2	10' x 12'	
Thermometer	1	Actron	Laser thermometer
Truck, Hand	1		
Utility Knives	8		
Winch	1	12000 lbs	Integrated Equipment on YC Engine 4:

Appendix E.

MEMORANDUM OF AGREEMENT

Between

The Peninsula Regional Technical Rescue Team

And

The Peninsulas Emergency Medical Services Council, Inc.

The Peninsula Regional Technical Rescue Team (PRTRT) and the Peninsulas Emergency Medical Services Council, Inc. (PEMS) enter into this agreement for the purposes of defining the relationship and responsibilities of both parties.

1. PEMS will provide administrative support and assistance to the PRTRT as follows:
 - A. Maintenance of the PRTRT funds donated or collected from private or public sources and issuance of checks to pay approved expenses from the PRTRT funds. PEMS will annually conduct an independent audit of its financial statements that will verify income and expenses related to the PRTRT funds.
 - B. Use of the PEMS name and non-profit status in order to receive funds donated to the PRTRT.
 - C. Staff and mailing assistance in distributing information to EMS agencies and the public in matters involving the PRTRT, its abilities and accessibility.
 - D. Representation on the governing body or standing committees of PEMS in order to exchange ideas and concerns regarding technical rescue needs throughout the region.
 - E. Representation of the PRTRT medical director on the Medical Directors Committee of PEMS, including dissemination of current medical protocols to PRTRT.
2. The PRTRT will supply the jurisdictions within the PEMS Region with technical data, equipment and expertise during a technical rescue incident. It will not be the responsibility of the team to relieve the first due company or the incident commander of his/her on-scene responsibilities or assume command of a technical rescue incident. The PRTRT will initially be composed of fire department technical rescue team resources from the cities of Hampton, Newport

News, Poquoson, Williamsburg, the counties of James City and York and the United States Army Transportation Center. The PRTRT will be regional in scope and will provide for certain policies and procedures to ensure regional participation and liaison with PEMS as follows:

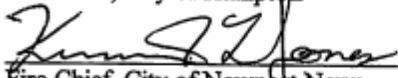
- A. Under the authority of this agreement, the PRTRT will provide on-scene response to any incident in the region in which specialized equipment, and personnel, assigned to the Technical Rescue Team are required to access, disentangle or remove victims trapped in unusual or extremely dangerous or hazardous environments.
- B. The PRTRT will develop and maintain a participation agreement and policies which specify organizational and leadership structure, voting privileges of members or jurisdictions and approval authority for the use of PRTRT funds. A current copy of these policies, approved by the jurisdictions participating in the PRTRT, will be provided to PEMS.
- C. PRTRT leadership will at least annually report to the PEMS Board of Directors on the past year's activities and on significant plans for the future.
- D. PRTRT will provide serial numbers and inventory numbers to PEMS of equipment purchased with PRTRT funds.
- E. PRTRT will provide original correspondence or materials, as necessary, to PEMS for distribution to EMS agencies or the public.
- F. PRTRT will biannually nominate a senior representative to the PEMS governing body or standing committees.
- G. PRTRT will appoint and maintain a current medical director, specializing in emergency medicine, and forward the name and address of the medical director to PEMS.

For the Peninsula Regional Technical Rescue Team



Fire Chief, City of Hampton

11/29/01
Date




Fire Chief, City of Newport News

6 DEC 01
Date



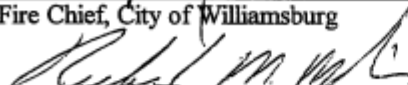
Fire Chief, City of Poquoson

12-6-01
Date



Fire Chief, City of Williamsburg

12/1/01
Date



Fire Chief, James City County

12/5/01
Date



Fire Chief, York County

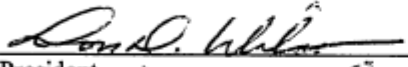
11/30/01
Date




Fire Chief, United States Army
Transportation Center

12/07/01
Date

For the Peninsulas Emergency Medical Services Council, Inc.



President 

12/10/2001
Date

Appendix F.

TIDEWATER REGIONAL EMS COUNCIL, INC.
REGIONAL TECHNICAL RESCUE TEAM
RESPONSE AGREEMENT

This agreement is designed to address the response, manning and training requirements associated with membership on the Tidewater Regional Technical Rescue Team.

1. Personnel requested to respond to a technical rescue incident will be provided coverage under the sponsoring jurisdictions liability and compensation regulations.
2. Personnel responding to an incident will be provided transportation to the emergency scene by the sponsoring jurisdiction.
3. Personnel will respond to the scene with personal protective clothing issued to them by the sponsoring jurisdiction.
4. Personnel will be made available for 72 hours per year to meet the continuing education requirements of the regional team. All team members will be provided liability and workman's compensation coverage by the sponsoring jurisdiction while participating in regional drills. Personnel shall be made available both on and off duty to assure compliance with the training requirements of team membership.
5. Team personnel required to respond outside of their jurisdiction during activation of the team for regional responses will be made available while on duty.
6. This agreement may be terminated by either party by providing written notice to the TEMS office 30 days prior to termination.

Agency Name (Sponsoring agency)

County of York - Fire & Rescue



Signature

7/19/96

Date

FIRE CHIEF
Title

Tidewater Regional Technical Rescue Team

Unit	Capabilities	Personnel Assigned
Virginia Beach Fire Department		
Squad 10	Standard Squad with on-board compressor, rope equipment, vehicle rescue equipment. Support equipment for building collapse, trench collapse and trench collapse	4
Tech 1	Primarily set-up for shoring operations for trench collapse and building collapse. Includes all equipment to support both operations. Confined space equipment for confined space operations. Also includes on-board air system (cascade).	4
Tech Trailer	Wood and lumber cache.	0
Norfolk Fire Department		
Rescue 2	Standard Heavy Rescue with vehicle extrication, rope rescue, SABA and limited shoring equipment. Also serves as a HAZMAT first response unit with detection and monitoring equipment	3
Ladder 14	Platform ladder truck with vehicle extrication equipment	3
Tech Trlr	Shoring Equipment/tools for structural collapse	0
Chesapeake Fire Department		
Squad 15	Heavy Rescue Squad with vehicle extrication, rope rescue and support equipment for shoring operations, light tower, on board generator and compressor, SABA units with Con-Space communications and ventilation capabilities. Various power tools and hand tools.	4
Tech 15 (Trlr)	Assortment of various sizes of trench panels, heavy assortment of Air Shores (capable of columns, tripods, rakers, gantry, etc.) Stanley equipment (power unit, breakers, cut off saw, diamond chainsaw and water pumps), table saw and other breaking and breaching equipment.	0
Portsmouth Fire Department		
Rescue 1	Standard Heavy Rescue with vehicle extrication, rope rescue, SABA, cascade, and limited shoring equipment.	3
Engine 4	Engine company with rope equipment and support personnel.	3
Tech 1	Shoring Equipment/tools for structural collapse and trench.	0
Navy Mid-Atlantic Fire Rescue		
Engine 11	2000 GPM Engine. Basic suppression equipment. This engine is staffed with individuals that have a technical rescue background.	4
Tower 11	A 100 foot aerial bucket truck. This truck is staffed with individuals that have a technical rescue background. This truck has additional equipment capable of mitigating a stokes basket/high angle rescue. Vehicle Rescue and High Angle Rope Rescue.	3

Tidewater Regional Technical Rescue Team

Squad 1	Heavy Rescue Squad with vehicle extrication equipment. Rope Rescue Equipment, Confined Space Rescue, Con-Space Communication Equipment. Cribbing and shoring. Additionally it has numerous saws and forcible entry tools. This vehicle also can assist in mitigating small HAZMAT emergencies.	1
Hampton Fire and Rescue		
Tower-08	Pierce 100' Tower with vehicle extrication (Genesis Hyd), Genesis Rescue Hand held Vario Tool, rope rescue, Class B foam, 2000 GPM	4
Tech-08	007 GMC model TC5C044, Genesis Rescue Portable Tool System, Class-B Foam	2
Collapse/Trench Trailer	6-trench panels, assortment of Air shores (capable of columns, tripods, rakers, gantry, etc.) cut of saw, Extra wood for cut lengths, Generator	0
Rope/Confined Space Trailer	Con-Space Communications, Electrical Fans, Tripods, 2-Stoke Baskets, 4-Air Reels, 6 SABA Units, 2-Air Carts, Class 2 and 3 Harness's, Rescue Rope (600' is Longest), Larkin Rescue Frame, Generator	0
Squad 1	Pierce Squad, 1500 GPM, 9000 Lb. Portable Wench, 4 Point connection to truck, 5 mounted 10000 PSI Hydraulic Lines/ Genesis Rescue tools, a portable unit, cribbing, Light Tower, Petrogen Torch	4
Newport News Fire Department		
Rescue 1	Scott SABA and are able to handle the following: Vehicle Extrication, High Angle Rope Rescue, Confined space with comms, Minor Building Collapse. High and medium pressure air bags. They also have a full set of patient packaging equipment. Light Tower and generators	3
Rescue 2	Scott SABA and are able to handle the following: Vehicle Extrication, High Angle Rope Rescue, Confined space with comms, Minor Building Collapse. High and medium pressure air bags. They also have a full set of patient packaging equipment. Light Tower and generators	3
Tech 10	TECH -10 is a heavy collapse truck. Tech -10 is able to handle the following. Trench Rescue, Building Collapse, B&B, Lifting and moving, Shoring. Light tower on board and portable Generators.	0
James City County Fire Department		
Rescue 31	Heavy Rescue with vehicle extrication Genesis Hyd , vehicle stabilization struts, rope rescue, confined space equipment, light tower, 30K generator	2-3

Tidewater Regional Technical Rescue Team

Utility 3 and Tech Trailer	20' trailer. Assortment of various sizes of trench panels, heavy assortment of Paratech Shores(capable of columns, tripods, rakers, gantry, etc.) , breakers, cut off saw, diamond chainsaw and water pumps, other breaking and breaching equipment.	2
York County Fire and Life Safety		
Engine 4	Heavy Rescue Engine with vehicle extrication (Genesis Hyd and Power Hawk electric), rope rescue, support equipment for shoring operations, light tower, 30K generator	2-3
Utility 4 and USAR 4	F650 with 46' 5 th wheel trailer. MSA SABA units with Con-Space communications, assortment of various sizes of trench panels, heavy assortment of Airshores (capable of columns, tripods, rakers, gantry, etc.) Stanley equipment (power unit, breakers, cut of saw, diamond chainsaw and water pumps), other breaking and breaching equipment.	2 (plus personnel above)

Appendix H.

