

Task Three Technical Memorandum For Federal Highway Administration (ITS-JPO) on Case Studies

Assessment of State of the Practice and State of the Art in Evacuation Transportation Management

Contract Number DTFH61-01-00183



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16. Abstract <p>Much of what is known about evacuations is based on preparations for incidents, such as hurricanes, for which there is advance warning. With advance warning, evacuations can be planned and managed using procedures and systems that have been developed as a result of extensive and methodical pre-planning. This approach, however, does not adequately support management of incidents when there is no advance warning or when conditions are changing rapidly. Evacuations in response to these types of incidents tend to be monitored, but not well managed. The Federal Highway Administration (FHWA) recognized the importance of and need for new tools and processes to help agencies plan for and manage evacuations where there is little or no advanced warning. Consequently, the FHWA initiated a project to assess the state of the practice and state of the art in evacuation transportation management.</p> <p>This report was prepared to document four case studies regarding no-notice evacuations from a transportation point of view:</p> <ul style="list-style-type: none"> • El Dorado, Arkansas, hazardous material fire • Graniteville, South Carolina, chlorine gas incident • South Salt Lake City, Utah, hazardous chemical leak from a tanker car • Big Bear Valley, California wildfires. <p>The intent of the case studies is to identify commonalities and unique distinctions among the cross-section of incidents to identify successes, lessons learned, and best practices to provide guidance to agencies in planning for and managing evacuations including transportation, public safety and other public organizations with a role in managing evacuations.</p>				
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1 EXECUTIVE SUMMARY

Booz Allen Hamilton recently prepared a literature search for the Federal Highway Administration for the Assessment of the State of the Practice and State of the Art in Evacuation Transportation Management project.

In the course of our literature search, Booz Allen found no definitive articles or publications that addressed no-notice evacuations. Much of what is known about evacuations is based on experience gained preparing for incidents—such as hurricanes—when there is advance warning.

Information has been written regarding the 9/11 terrorist acts in New York City and Washington, DC; the blackouts of New York City and Detroit, Michigan; the firestorms of British Columbia, Canada; the Southern California wildfires; the Northridge earthquake; the I-95 tanker explosion; and the Howard Street rail tunnel fire in Baltimore, Maryland. However, the focus of this information was not necessarily on evacuations.

From reports and numerous other articles and publications, the literature search attempted to assess what is known about transportation management during evacuations associated with no-notice situations.

The next step in the project is the delivery of case studies regarding no-notice evacuations from a transportation point of view. Four possible candidates identified included the:

- El Dorado, Arkansas, hazardous-material fire
- Graniteville, South Carolina, chlorine gas incident
- South Salt Lake City, Utah, hazardous chemical leak from a tanker car
- Southern California wildfires.

These case studies were identified for several reasons, including:

- The Graniteville and El Dorado incidents both involved no-notice evacuations and have occurred recently with lessons to be learned still fresh in the mind of participants.
- The El Dorado incident involved the evacuation of two nursing homes and a jail, thus providing information on the transportation of special needs evacuees.
- The South Salt Lake City incident involved a large-scale no-notice evacuation of 3,000 people in a major urban area and involved a closure of the interstate system for a period of time.
- The southern California wildfires have been previously studied, but not from a transportation perspective.

The intent of the case studies is to identify commonalities and unique distinctions among the cross-section of incidents to identify successes, lessons learned, and best practices to provide guidance to agencies in planning for and managing evacuations.

These case studies address not only the transportation aspects of an evacuation but also the necessary support from public safety and other public organizations with a role in managing evacuations.

1.1 Organization of the Case Studies

Booz Allen addressed the following issues with each case study:

- What happened in terms of the incident and the evacuation
- Description of the community
- The focus at the start, during, and after the evacuation
- Transportation impacts
- Advance planning and preparation
- Communication between entities and to evacuees and the general public
- Use of intelligent transportation systems (ITS) equipment/advanced technology
- Coordination efforts
- Decision making
- Difficulties in the evacuation
- After-action reports
- Special needs evacuations if applicable
- Best practices
- Lessons learned
- What worked and what did not work
- Improvements for next time.

1.2 Summary of the Events

Booz Allen reviewed four incidents in the development of the case studies.

El Dorado, Arkansas

This first case study focuses on a hazardous material fire in El Dorado, Arkansas, that involved the evacuation of two nursing homes and a county jail facility. The incident occurred on January 2, 2005.

Graniteville, South Carolina

The second case study concerns a train derailment and a ruptured tanker car leaking chlorine gas in Graniteville, South Carolina. This incident, which occurred on January 6, 2005, involved the evacuation of a large manufacturing facility and approximately 5,200 residents.

South Salt Lake City, Utah

The third case study concerns a toxic chemical spill from a leaking tanker car in South Salt Lake City, Utah. This incident, which occurred on March 6, 2005, involved the evacuation of approximately 3,000 residents and required the closure of two interstates.

Big Bear Valley, California

The fourth case study concerns a forest fire in Big Bear Valley, California, that started on October 25, 2003, and was one of the many wildfires in southern California in 2003. This incident involved the evacuation of approximately 20,000 to 30,000 residents/evacuees. The focus of the case study is Big Bear Valley, which consists of the communities of Big Bear City, Big Bear Lake, and Fawnskin.

1.3 Summary of the Findings

The four incidents selected are incidents that can happen almost any day, anywhere in the United States. These incidents are on a smaller scale than those such as 9/11 or the East Coast blackouts in 2003, but they have a higher probability of occurring at any time, in any place. In fact, while Booz Allen conducted the interviews for this project on the Old Fire incident, three major forest fires were burning in southern California and one was burning in the San Bernardino National Forest area.

1.3.1 Common Successes

Common themes throughout the case studies are the use of the incident command system and training for possible incidents.

Incident Command

In all of the case studies, an incident command was quickly established after the incident, with entities understanding their roles and responsibilities. Not all establishments of an incident command went smoothly. However, once established and functioning, the use of an incident command allowed for a unified response to the incident.

Training

The case studies highlighted the impact of inter-entity training on the management of incidents. Due to the training, entities responded to the incidents effectively and coordinated their responses. Entities that train together are able to establish a unified command quickly and have a more effective response.

Training ranges from tabletop exercises to full-scale incidents such as a weapons-of-mass-destruction scenario. Inter-entity training provides pre-incident planning with the ability to revise procedures before having to actually exercise them. It allows entities to establish relationships as well as build on existing ones.

Training allows an entity to test its resources in a safe environment and learn from its mistakes safely. Training contributed to the success of the responses to the incidents that are the subjects of the case studies presented in this report.

1.3.2 Transportation Impacts

Impacts to the transportation system depend on the incident. Two of the incidents resulted in little to no impact on the local transportation systems, while two others did have an impact.

El Dorado, Arkansas

There appeared to be no impact to the transportation system due to the El Dorado incident. The police department cordoned off the evacuation zone, and traffic was rerouted through town. The main north-south roadway, US 167, was closed, but traffic was rerouted around the downtown. This incident happened on a Sunday morning, but if it had occurred during the week, there still would have been little impact on the traffic system.

However, since the residents of the nursing homes and prisoners at the county jail facility are without personal vehicles, ambulances and school buses were used to

evacuate the nursing home residents and school buses were used to evacuate the prisoners.

Graniteville, South Carolina

There appeared to be little impact to the transportation system due to the Graniteville incident. The Aiken County Sheriff's Office cordoned off the evacuation zone, and traffic was rerouted through the community. The main thoroughfare (Aiken/Augusta highway), a four-lane roadway connecting Aiken, South Carolina, to Augusta, Georgia, was closed for over a week, but traffic was rerouted through the area onto parallel roads or Interstate 20.

South Salt Lake City, Utah

The rail yard is located near the intersection of Interstate 15 (I-15) and Interstate 80 (I-80), which had to be closed. In addition, some local streets were also closed.

The South Salt Lake City Police Department, Utah Department of Public Safety, and Utah Highway Patrol were involved in the closing of the roadways. Roadways were quickly blocked with barricades and barrels.

As the neighborhoods were evacuating, the local streets were barricaded with roadblocks to prevent the reentry of residents and the entry of unauthorized personnel.

At approximately 12:45 pm on Sunday, March 6, 2005, I-15 and I-80 were shut down, which took a little more than 1 ½ hours. Initially, Utah Department of Transportation resources were used to close the interstates. Once it was determined that the closure would take longer than anticipated, a decision was made to use an authorized traffic management contractor to close down the interstates with barriers and electronic signs.

State troopers were sent to patrol and monitor the closed freeways to ensure motorists did not drive onto the roadways.

The main means of communication to the traveling public was with fixed and portable dynamic message signs, 511 travel services, highway advisory radio, and the commuter link Web site. It was felt that the notification worked well.

There was an initial backup of approximately 1 to 2 miles when the interstate was initially closed, but this was quickly dissipated. While not associated with this incident, the Utah Department of Transportation conducted a public opinion poll and found that 70 percent of people will change their travel pattern if information is provided. After the initial closure, traffic was manageable.

Big Bear Valley, California

There are three main evacuation routes out of Big Bear Valley; one to the west, which was closed, and two that are north and south of the valley. There was concern with the loss of the remaining roads as evacuation routes and with possible accidents that would slow the progress of evacuees. The emergency community looked into the possibility of staging resources along the evacuation route to push vehicles off the roadway if necessary.

The roadways in the valley did not allow for a quick evacuation. However, there were no incidents on the road; people were patient and there were no recorded instances of flared tempers. People made the best of the situation.

Based on experience, the local emergency management community now has an estimated time to evacuate the valley, in case this is necessary in the future.

1.3.3 Transit Agency Participation

Public transit agencies played a factor in the evacuation of Big Bear Valley. Through their coordination of efforts, the evacuation of residents without transportation was successful.

The Mountain Area Regional Transit Authority (MARTA) was one of two public transit agencies that participated in the evacuation of residents from the valley down the mountain and into public shelters.

MARTA provided the initial transportation in the valley and off the mountain. The agency learned of the need for an evacuation through its seat at the unified command center and received information at the same time as the other participants. MARTA was represented 24/7 and used its radio system to contact its base and operators.

MARTA vehicles and manpower were staged at the command post to allow for the evacuation of residents. Initially, six vehicles were utilized, but through creation of 12-hour shifts, three vehicles were used to evacuate approximately 1,200 residents.

Omnitrans was the second transit agency involved in the evacuation of Big Bear Valley. The agency provided assistance by meeting MARTA buses at the bottom of the mountain at evacuation centers and transporting the people to public shelters established in San Bernardino County. Eventually, the public shelters were merged into one super-shelter at the San Bernardino International Airport. Omnitrans provided transportation to that location.

1.3.4 Difficulties in the Evacuation

All of the incidents reviewed involved some difficulty in either the incident and/or evacuation, and they varied per incident.

El Dorado, Arkansas

Difficulties included:

- Determination of the chemical involved
- Legal actions
- Receipt of information from other entities.

Graniteville, South Carolina

Difficulties included:

- Internal bickering over the establishment of the initial incident command center
- Loss of the main fire station.

South Salt Lake City, Utah

Difficulties included:

- Identification of the chemicals on the leaking rail car

- Incorrect train manifest.

Tools cited as necessary due to the South Salt Lake City incident difficulties are continued use of placards on the sides of the railcars indicating the product in the tank car and regulations on how to properly load rail cars.

Big Bear Valley, California

Difficulties included:

- Incompatible communication systems
- No communication when the valley incident commander was unable to access the incident command center.

1.3.5 Special Needs Evacuations

Three of the four incidents reviewed involved special needs evacuations. Two nursing homes, a county jail, pets, a community hospital, and schools were all successfully evacuated.

El Dorado, Arkansas – El Dorado County Jail Facility

When the sheriff decided to evacuate the jail facility, a choice regarding which roadways to use was made. It was determined that the convoy would proceed down state roadways rather than county roadways due to several factors: (a) the state roadways were felt to be more secure; (b) there were wide shoulders and, in case of an accident, buses could be moved onto the shoulder or, in the case of an automobile accident, the automobile could be moved onto the shoulder not impeding the movement of the buses; and (c) there are more lanes allowing for faster speeds and movement past an accident.

Why Was the Evacuation a Success?

The sheriff felt that there has always been the threat of an evacuation, and he had “years to think about it.” He communicated the plan with two others on his staff, the chief deputy and the jail administrator, so they knew what to do in case the sheriff was incapacitated. To ensure the availability of someone who knows the plan, the sheriff makes certain that all three persons are not off duty at the same time. There is at least one of them on site at all times. The sheriff realizes that the evacuation plan should be written down and taught to others of his staff, but this may not happen in the near future due to a lack of resources.

El Dorado, Arkansas – Hillsboro Manor Nursing Home

The director of nursing received a page from the 911 system while attending church and was told to: (a) be prepared to evacuate and (b) prepare for a return call to evacuate. After this initial contact, Hillsboro started to evacuate the residents before the order to evacuate was received. Shortly thereafter, a call was received to evacuate the nursing home.

The police department and volunteers from the community acquired buses for the transportation of residents to their designated public shelter. There were approximately 96 patients and over 50 staff that needed to be evacuated. Most of the residents could be moved by either school or church bus (regular and wheelchair accessible), but residents who could not walk were transported by ambulances to the hospital or other nursing homes.

One man from a church brought a truck that was used to move wheelchairs, bedding, linen, the medicine carts, and food prepared for lunch.

The police department provided an escort to the public shelter.

Why Was the Evacuation a Success?

Numerous reasons contributed to the success of the evacuation:

- Community volunteers assisted in the evacuation, such as by providing a truck to transport items or church buses to transport residents and staff.
- There was easy access to transportation.
- Hillsboro had written procedures on evacuations. At least annually, the nursing home had practiced an emergency drill for evacuation of the nursing home.
- The delegation and assignment of activities to staff kept them focused on the evacuation and not on what-if scenarios.
- There was the experience of previous partial evacuations.

El Dorado, Arkansas – Oakridge Nursing Home

At 9:30 on Sunday morning, the assistant administrator was contacted at home and informed by the 911 system that the Teris plant was exploding. Within 10 minutes of the phone call, the assistant administrator arrived at the nursing home. At this point, it was decided to start shelter-in-place procedures.

After this initial activity, the assistant administrator was waiting for the word to evacuate Oakridge. Approximately 1 hour after the initial call, someone from a church arrived to help Oakridge evacuate. This individual informed the assistant administrator that “everyone was evacuating,” and the evacuation started at this point.

There was no official call from the local emergency management officials for an evacuation, nor were there American Red Cross officials assisting in the evacuation of the Oakridge Nursing Home. The assistant administrator would have liked to have emergency officials helping during the evacuation. “If not for the churches and family members, we would have had a problem.”

A total of six church and school buses were used to evacuate the residents. One of the school buses was wheelchair-lift equipped, and Oakridge could have used more of those types of buses.

Why Was the Evacuation a Success?

Oakridge staff has received training on evacuation and has reviewed the shelter-in-place video. That information combined with the knowledge of how to handle other types of emergencies led to a successful self-evacuation.

Graniteville, South Carolina

Some residents who evacuated left behind pets and later became concerned about their pets when they realized the extent of the incident. The Aiken County Animal Control Department called on other animal control departments to assist in the retrieval of pets from the evacuation zone. Evacuees contacted animal control with pet information and keys to their homes. Once the pets were retrieved, evacuees had to contact animal control and set up an appointment to pick up their pet. As a result, more than 287 pets were reunited with their owners.

Big Bear Valley, California – Bear Valley Community Hospital

Bear Valley Community Hospital long-term residents were evacuated during the Old Fire incident. Once the decision was made to evacuate the community, the hospital instituted an internal disaster plan. When the hospital was informed of a voluntary evacuation, the director of nursing provided guidance to the staff and delegated responsibilities to perform certain tasks. Some staff were directed to prepare the residents for an evacuation, pack up resident's medical records, pack up 3 days of food, pick up the medications, call in additional clinical staff, and contact families. By delegating tasks, the staff focused on the evacuation of patients and not necessarily on the fire situation.

Why Was the Evacuation a Success?

The evacuation of the hospital was coordinated with the Bear City Fire Department and the City of Big Bear Lake Emergency Management Services through the Emergency Operations Center. A week before the evacuation occurred, the fire chief contacted the hospital and conducted pre-disaster planning such as, if the need for an evacuation was clear, what type of transportation was needed and from where would the transportation come.

Big Bear Valley, California – Bear Valley Schools

Schools in Big Bear Valley were evacuated. The day before the evacuation of the valley, the superintendent of the schools was informed of the potential for an evacuation and passed this information along to staff of the school district. Students of the schools were sent home. District staff were told that the local emergency management officials would not try to evacuate when school was in session. However, the next day, after students were at school, the winds picked up and a mandatory evacuation of the valley occurred.

Why Was the Evacuation a Success?

The evacuation of schools in Big Bear Valley was a success due to several factors:

- An orderly process was developed to allow parents to pick up their children in a calm setting.
- There was school training for emergency drills.
- The Big Bear Valley incident commander decided to hold off announcement of an evacuation until the school children arrived at school, rather than while they were in transit, thus allowing for an orderly evacuation of students.

1.3.6 Lessons Learned

Numerous lessons were learned during all of the incidents. Lessons learned were categorized into advance planning, advanced technology, coordination, communication, and transportation.

Sample lessons learned include:

Advance Planning

- Adopt a reentry plan – Big Bear Valley, California.
- Provide standardized identification badges – Graniteville, South Carolina.
- Review incidents (including others) for lessons to be learned – El Dorado, Arkansas.
- Utilize traffic engineers earlier in the incident – South Salt Lake City, Utah.

- | | |
|---|---|
| Advanced Technology Coordination | <ul style="list-style-type: none"> • Use technology and tools during the incident – Graniteville, South Carolina. • Activate local emergency planning committee members early in the incident – El Dorado, Arkansas. |
| Communication | <ul style="list-style-type: none"> • Verify mutual aid sources – Graniteville, South Carolina. • Ensure notification of the evacuation to the dispatch center – South Salt Lake City, Utah. • Ensure the Reverse 911[®] system has current information – Graniteville, South Carolina. • Have secure lines of communication – Big Bear Valley, California. • Keep a current list of media contacts and include alternate numbers – El Dorado, Arkansas. |
| Transportation | <ul style="list-style-type: none"> • Know the location of specialized equipment to transport nursing home residents – El Dorado, Arkansas. |

1.3.7 Best Practices

All of the incidents reviewed utilized some best practices regarding evacuation management to a degree. The following best practices were identified based on the interviews:

- Ability to change procedures on the fly
- Communication workarounds
- Controlling a potentially chaotic scene with evacuation procedures
- Daily meetings
- Fact sheets and press briefings
- Joint information center
- Pet unification plan
- Placement of an incident command quickly
- Town hall meetings
- Training, including tabletop exercises
- Unified incident command
- Use of the 2-1-1 system for human and volunteer services
- Use of an incident command
- Use of the national incident management system.

1.4 Recommendations

Improvements that can be made to evacuation transportation planning and management methods revolve around additional tools for evacuation management. The tools identified are currently available in most states and are low-cost tools that can provide additional information or services to communities during times of crises.

Tools are identified as either devices or services.

1.4.1 Devices

Handheld Communication Devices

In several of the case studies, a compact handheld communication device was expressed as being potentially useful in the field. It could eliminate the radio and be

small enough to allow for both voice and text messaging. It could also be used to communicate to forward command, to others in the field, or up to the command center.

With the use of a handheld device, there is the possibility of introducing Internet access in the field. Internet access allows public information officers the ability to post information, answer media questions, and communicate to the public in a real-time mode. It allows information to flow from the field to the general public in a very short period of time and could allow the general public to react quickly to a possible evacuation order. Internet access provides an additional means of communication to the general public regarding an incident.

Portable Message Signs

Portable message signs were used in a few of the case studies to communicate information to the general public regarding roadway conditions. Portable message signs can prove to be invaluable when local entity resources are required to provide a soft closure of a roadway or provide information to the general public on possible incident areas.

In a public opinion poll, the Utah Department of Transportation found that 70 percent of the public would change their travel plans if they have information on possible incidents. A portable message sign allows for people in the field to quickly communicate information to the public regarding roadways and incidents and allows people to alter their plans before entering the incident zone. Portable message signs allow people to make informed choices while traveling, possibly leading to reduced congestion at an incident zone.

1.4.2 Services

2-1-1 System

A new 2-1-1 system, currently available in 32 states, provides social services information to citizens during times of crises. 2-1-1 is a human resources referral agency that “provides callers with information about and referrals to human services for every day needs and in times of crisis. For example, 2-1-1 can offer access to the following types of services:

- Basic Human Needs Resource: Food banks, clothing closets, shelters, rent assistance, utility assistance
- Physical and Mental Health Resources: Health insurance programs, Medicaid and Medicare, maternal health, Children's Health Insurance Program, medical information lines, crisis intervention services, support groups, counseling, drug and alcohol intervention and rehabilitation,” as reported on the 211.org Web site.

During the Graniteville incident, the Salvation Army/United Way manned the telephone line and was a “talking human resource directory” for residents of the community. Information ranged from what can we do to help, to what agencies can help, to where can we go to get food. The 2-1-1 system moved phone traffic away from the 911 system and allowed the 911 system to remain open for emergency use.

Safe Community Alert Network (SCAN)

One fire department interviewed for this report mentioned its department signed up for a communication system, SCAN, that provides emergency management information to both the public and emergency responders.

According to SCAN, it is “a public warning system that allows local police departments, fire departments, emergency management services organizations, schools and public safety agencies to broadcast emergency information directly to the computers, mobile phones, pagers and personal digital assistants of their neighborhood and local residents”. Through SCAN, residents can now receive immediate alerts for neighborhood crime and terrorism, sexual predators moving into the area, weather and natural disasters, cyber attacks, fire advisories, health emergencies, as well as neighborhood public safety information.

The SCAN service broadcasts alerts as they become available in the zip code areas for which users have registered. SCAN maintains a 24-hour, 7-day service and support bureau that collects and reviews alert content and broadcasts those alerts to those registered users that have opted-in to the SCAN service.

Registered users receive the SCAN service free of charge. SCAN is free of charge to all public safety agencies of all types, municipal, county, state and federal, as well as schools, colleges and universities, and hospitals.

2 INTRODUCTION

Booz Allen recently prepared a literature search for the Federal Highway Administration for the Assessment of the State of the Practice and State of the Art in Evacuation Transportation Management project. From reports and numerous other articles and publications, the literature search attempted to assess what is known about transportation management during evacuations of no-notice situations.

The next step in the project is the delivery of case studies regarding no-notice evacuations from a transportation point of view. Four possible candidates identified included the:

- El Dorado, Arkansas, hazardous-material fire
- Graniteville, South Carolina, chlorine gas incident
- South Salt Lake City, Utah, hazardous chemical leak from a tanker car
- Southern California wildfires.

These case studies were identified for several reasons, including:

- The Graniteville and El Dorado incidents both involved no-notice evacuations and have occurred recently with lessons to be learned still fresh in the mind of participants.
- The El Dorado incident involved the evacuation of two nursing homes and a jail, thus providing information on the transportation of special needs evacuees.
- The South Salt Lake City incident involved a large-scale no-notice evacuation of 3,000 people in a major urban area and involved a closure of the interstate system for a period of time.
- The southern California wildfires have been previously studied, but not from a transportation perspective.

The intent of the case studies is to identify commonalities and unique distinctions among the cross-section of incidents to identify successes, lessons learned, and best practices to provide guidance to agencies in their planning for and management of evacuations.

Each case study follows the following format:

• What happened in terms of the incident and the evacuation	• Decision making
• Description of the community	• Difficulties in the evacuation
• The focus at the start, during, and after the evacuation	• after-action reports
• Transportation impacts	• Special needs evacuations
• Advance planning and preparation	• Best practices
• Communication between entities and to evacuees and the general public	• Lessons learned
• Use of ITS equipment/advanced technology	• What worked and what did not work
• Coordination efforts	• Improvements for next time.

3 CASE STUDY #1 – El Dorado, Arkansas – Hazardous-Material Fire, January 2, 2005

This first case study focuses on a hazardous material fire in El Dorado, Arkansas, that involved the evacuation of two nursing homes and a county jail facility. The incident occurred on January 2, 2005. Appendix 1 provides a listing of organizations contacted for this case study.

3.1 What Happened

3.1.1 Incident

On the Sunday morning of January 2, 2005, a report to the National Resource Center indicated an explosion and fire had occurred at the Teris LLC facility in El Dorado, Arkansas. The facility initially reported that an employee attempted to extinguish a small fire within a warehouse storing various waste containers, but that the fire soon grew out of control.

Response organizations (El Dorado Fire and Police Departments, as well as the Union County Sheriff's Department) quickly responded. The El Dorado Fire Department was first on the scene and established an incident command to identify a strategy and response procedures for dealing with the emergency. Once the incident command was established, a phone tree was used to alert other emergency management entities and the Local Emergency Planning Committee. From the start of the incident, all involved entities knew who was in charge.

Fire fighting was conducted by Teris personnel on site. The El Dorado Fire Department established a position on the perimeter of the facility in case they were needed, but they did not enter the plant.

The United States Environmental Protection Agency (EPA) Region 6 dispatched an Airborne Spectral and Photographic Environmental Technology (ASPECT) plane to monitor the plume.

3.1.2 Evacuation

Approximately ½ hour after the incident, the incident commander determined that a mandatory evacuation was necessary, and the order was implemented. The 911 system received the evacuation order and contacted the media and the nursing homes to inform them of the evacuation. The 911 system operator had a specific contact list for the nursing homes.

Local responders closed nearby streets, as well as evacuated residents downwind from the facility. Exhibit 1 presents an approximate timeline.

Exhibit 1—Timeline for El Dorado Incident

Sunday, January 2, 2005	Event
8:00	Incident occurred
8:30	Decision to evacuate—mandatory evacuation
10:30	Evacuation completed
19:00	Local officials lifted part of the evacuation area
Monday, January 3, 2005	Event
16:00	All evacuations and road closures were lifted

The total time from the incident to the return of citizens was approximately 34 hours. The evacuation itself took approximately 2 hours for the nursing homes and approximately 2 hours for the other El Dorado residents. An estimated 500 El Dorado citizens were evacuated overnight.

3.2 Community

The community of El Dorado is located in Union County in the south central part of Arkansas, close to the State of Louisiana border, and has approximately 25,000 residents. El Dorado is home to numerous chemical, manufacturing, and oil facilities. These facilities include Teris, Murphy Oil Corporation, ConAgra Foods, Georgia Pacific, Panda Energy International, Cooper/Standard Automotive, Prescolite (lighting manufacturer), Delta Timber Corporation, Anthony Forest Products Company, Great Lakes Chemical Corporation, Lion Oil Refining Company, and Del-Fin Fiber LLC (fiberboard manufacturer).

The El Dorado incident occurred at the Teris facility. Teris is an incineration and special handling facility of hazardous and non-regulated waste such as liquids, sludges, and hardened material. Teris is one of several chemical, manufacturing, and oil facilities located in the community.

In addition to the chemical, manufacturing, and oil facilities, in the community, there are seven nursing homes, two of which are located near the Teris facility, and a county jail, also located near the Teris facility.

In Union County, there is a Local Emergency Planning Committee (LEPC). The Union County LEPC consists of representatives of elected officials, law enforcement, firefighting, emergency medical services, health care, and facilities subject to the emergency planning and community right-to-know requirements.

Members include the mayor of the City of El Dorado, El Dorado Water and Utilities, the Union County Health Unit, the sheriff of Union County, the Lion Oil Company, ProMed Ambulance, Murphy Oil, the Arkansas Department of Health, the Calion Fire Department and Water Works, Union County Judge, Cross Oil Company, the El Dorado School System, the El Dorado Fire Department, the Salvation Army, Teris, the El Dorado Police Department, the Union County Emergency Management Coordinator, and the Medical Center of South Arkansas. Monthly emergency planning meetings are held.

A primary responsibility of the LEPC is to help maintain the county emergency plan that outlines preparation and response to community emergencies, disasters, and domestic terrorism. The LEPC also serves as a focal point in Union County for information and discussions about hazardous substances, emergency planning, and health and environmental risks.

The LEPC is active and schedules frequent disaster drills. For example, in a February 2005 tabletop exercise, the LEPC had a scenario of a pipeline explosion next to a nursing home. On September 23, 2005, there was an exercise based on the need for the bomb squad and HazMat response team. The draft scenario was as follows:

- Someone notices suspicious character and or package
- Places call to emergency services 911
- Police department responds
- First officer needs assistance and calls for SWAT team
- SWAT team arrives and takes out bad guys
- Bad guys injured and sent to Medical Center of South Arkansas
- Auto accident outside crime scene and injured sent to Medical Center of South Arkansas
- SWAT team discovers suspicious package/pipe
- Bomb squad notified
- El Dorado Fire Department HazMat team notified
- Bomb squad arrives and disarms device
- El Dorado Fire Department HazMat team sets up with decontamination bomb squad
- Crime scene turned over to terrorist investigation team
- Drill ends.

Union County also has a County Emergency Management Coordinator (CAMC) who is responsible for offering assistance and additional resources during emergencies such as manpower and equipment. The CAMC acts as a liaison between the local government and state during times of crisis. This individual co-chairs the LEPC.

3.3 Focus

Questions were asked regarding the focus at the beginning of the evacuation, during the evacuation, and after the evacuation. The purpose of the questions was to determine how the focus of an incident changes as the incident evolves. Predominately, the focus at the beginning of the evacuation was getting the residents out of harms way and making sure the public was safe.

During the evacuation, the focus varied depending on the position of the interviewee. Responses varied from:

- Keeping out sightseers from the evacuation zone – Union County Emergency Management
- Keeping people out of the evacuation zone, dealing with citizens who had left behind pets and medication, and dealing with people concerned with their homes – El Dorado Police Department.

After the evacuation, responses varied from:

- Dealing with aftereffects of the fire, smoke and chemicals in the air – Union County Emergency Management
- Allowing people back into their homes – El Dorado Police Department
- Making sure homes were safe to return to, conducting ground testing of the air near evacuated residential homes, and if possible conducting swab tests inside homes for chemical residue – Union County Emergency Management.

Generally, the immediate focus at the start of the evacuation is to move residents out of the evacuation zone; after that, the focus depends on the entity and its role in the evacuation.

3.4 Transportation Impacts

There appeared to be no impact to the transportation system due to the El Dorado incident. The police department cordoned off the evacuation zone, and traffic was re-routed through town. The main north-south roadway, US 167, was closed, but traffic was rerouted around the downtown. This incident happened on a Sunday morning, but if it had occurred during the week, there still would have been little impact on the traffic system.

However, since the residents of the nursing homes and prisoners at the county jail facility are without personal vehicles, ambulances and school buses were used to evacuate the nursing home residents and school buses were used to evacuate the prisoners.

Predominately, the method of transportation for the nursing home residents was the use of buses; however, there were approximately 15 to 33 residents that required the use of ambulances for their evacuation. Six ambulances were used to evacuate these residents. Four ambulances were from the city and two were from the county.

More information will be found later in this section on the evacuation of the nursing homes and the county jail.

3.5 Advance Planning and Preparation

3.5.1 Drills, Tabletop Exercises, and Incidents

Drills, tabletop exercises, and actual incidents keep the El Dorado emergency management agencies active throughout the year. Approximately three to four times a year, the incident command system is established to handle the latest emergency. For example, on a particular stretch of a local roadway, due to a potential tight turning radius, propane trucks overturn two to three times a year requiring the evacuation of the local neighborhood.

The El Dorado community has a number of chemical, manufacturing, and oil facilities, and the attitude among the emergency management agencies appears to be that there is the “potential for anything to happen.” As a result, the LEPC conducts drills and tabletop exercises several times a year. Scenarios include HazMat, a pipeline explosion,

bomb scares, and a tornado touch down. In addition, a number of the facilities such as the Lion Oil Company conduct their own drills and invite the LEPC to participate.

Even though annual drills are required by Arkansas law, the LEPC traditionally conducts more drills. As mentioned by one of the interviewees, they are “the drilliest part of the state.”

3.5.2 Equipment/Supplies

Little additional equipment appeared to be needed for the incident. One piece of equipment mentioned was air-monitoring equipment. The EPA flew in the specialized air-monitoring equipment and, within 3 hours of the incident, the equipment was in place, monitoring the air quality. Through mutual-aid agreements, additional equipment was available through other emergency management entities.

A private contractor was engaged to provide fuel for the emergency management vehicles. The Salvation Army provided a food canteen for emergency management staff.

3.5.3 Emergency Preparedness Plan

El Dorado County has an All Hazards Emergency Plan prepared by the LEPC. One aspect of the plan is the description of the role of emergency entities during emergencies. It was mentioned several times that the All Hazards Emergency Plan is updated frequently as needed. For example, a component on terrorism was added after 9/11 and, during the anthrax scare, a component was added to address anthrax.

While the evacuation of nursing homes is not addressed in the All Hazards Emergency Plan, it was mentioned that the emergency management entities are aware of the number of nursing homes and residents that may require evacuation.

3.5.4 Manpower

Some off-duty personnel were called in between the police and fire departments since the incident occurred on a weekend with a normal skeleton staff, but no additional manpower resources were needed from outside the community.

The sheriff's office was primarily concerned with the evacuation of the county jail, and as a result of the use of an incident command and the appearance of adequate resources, the sheriff and his staff concentrated on the evacuation of 170 prisoners and 60 staff members. Without the need for a jail evacuation, the sheriff's office normally contributes resources to the LEPC.

As the incident came under control, resources were released.

3.5.5 Monthly Emergency Planning Meetings

The LEPC holds monthly emergency planning meetings. Meeting programs range from planning spring drills to discussions on pipeline safety, mass vaccinations, acid incidents, and drill critique.

3.5.6 Public Shelters

The Red Cross has the responsibility of identifying public shelters that are to be used in times of emergencies. The community has 8 to 10 potential sites that can be used as

public shelters, including the municipal auditorium, a college gym, churches, and commercial structures. Shelters are selected that have storage, overnight sleeping, kitchen, and restroom facilities.

The shelters are not identified ahead of time due to the possibility of a shelter being included in the incident zone. Depending on the situation, the Red Cross will open shelters as needed.

During the El Dorado incident, the Union County Emergency Management Director contacted the Red Cross via a cell phone, and the Red Cross, in turn, determined the location of the three shelters.

Initially, the city auditorium was announced as a public shelter, but due to concern with the plume and wind direction, it was decided to use churches in the community as public shelters for citizens during the incident. There was no turning away of residents from the public shelters, but some residents had to be redirected to other shelters due to the air conditions.

One out of the three public shelters that were opened was primarily used by the residents of one evacuated nursing homes. Comments were made that most of the non-nursing home residents who were evacuated either went to stay with other family members or stayed at the third public shelter.

3.6 Communication

3.6.1 Communication Between Agencies

Main Means of Agency Communication

Early in the incident, the El Dorado Fire Department established an incident command. At the incident command, representatives from the various entities involved such as the El Dorado Fire Department, El Dorado Police Department, ProMed Ambulance Service, Teris, Arkansas Department of Air Quality, and EPA had “a seat at the table” and were provided information, which they, in turn, communicated to their respective staffs.

Receipt of Initial Information on the Incident

People such as the Union County Emergency Coordinator and one of the nursing home staff were contacted at home or paged by either the police or fire department informing them of the incident. Others had heard the explosions and saw black clouds coming from the Teris facility.

Once the incident command was established, a phone tree was used to alert other emergency management entities and the LEPC.

Types of Communication

Radios, landlines, and cell phones provided the backbone of the communication system.

The El Dorado Police Department, El Dorado Fire Department, and 911 system share radio frequencies and have a single dispatch system. The ambulance service has its own radio frequency, but they monitored the shared radio system. No mention was made of a breakdown in communication or a need for additional equipment.

3.6.2 Communication to Evacuees and the Public

Means of Communication

The primary means of communication to the evacuees and the public was through the media, both television and radio. However, during the initial response actions, officials attempted to contact local radio stations to broadcast precautionary measures for residents. Due to the day and time, the stations were operating automatically and were not staffed. The closest television station is 3 hours away and, by the time the information was provided to the public by television, the evacuation was completed.

In addition, the El Dorado Police Department went into the evacuation zone and, with the use of a public address system, communicated the need to evacuate to “stragglers.”

The incident occurred early on Sunday morning while churches were in session. During the services, it became apparent that an incident was occurring and church services were terminated with people being allowed to evacuate from that location.

Joint Information Center

Initially, Teris established a communication center at a local hotel and the incident command established one at another location. Eventually, the two communication centers were unified into a single information center.

After the media was engaged, regular briefings were given at a local hotel starting every 2 hours, but eventually the briefings were further spread apart since it was felt that one briefing would finish and another would start up immediately. Officials at the Teris facility and the State Department of Air Quality eventually joined the briefings to communicate actions to be undertaken.

An officer from the El Dorado Police Department served as the public information officer for the El Dorado Police Department, El Dorado Fire Department, and LEPC. One unified voice provided public information.

At some point in the evacuation, citizens attended the briefings to ask when they could return home. People were frustrated that they could not return home immediately.

3.7 Use of ITS Equipment/Advanced Technology

During this evacuation, no advanced technology was needed, nor was the need for such technology ever expressed during the interviews.

3.8 Coordination

One message received clearly from all of the interviews with emergency management officials was the total coordination and cooperation of all entities, such as police, fire, ambulance, and the LEPC.

During the incident, the management and coordination of the event was a local decision. The Arkansas Department of Air Quality and the EPA provided resources, made suggestions, and participated when asked.

Due to the use of an incident command and previous training exercises, there was no internal bickering, and each of the entities involved knew their respective roles and executed those roles. The El Dorado Police Department was responsible for traffic control and the evacuation of the residents, while the El Dorado Fire Department established and operated the incident command, operated the city ambulances, and was available to help with the Teris fire, if requested.

3.9 Decision Making

The El Dorado incident involved an explosion and fire at the Teris facility. As a result of the type of incident, the incident command was the responsibility of the El Dorado Fire Department. The decision to evacuate was made by the incident commander based on the toxicity of the chemicals and the fire. The police department supported the call for an evacuation and implemented a mandatory evacuation.

At the Teris facility, an on-site State of Arkansas hazardous waste inspector monitored Teris activities. During the explosion and fire, the inspector monitored Teris activities to ensure that the situation in terms of air pollution/contamination did not worsen. Information gathered at the scene was transmitted to the office in Little Rock, Arkansas.

State of Arkansas Department of Air Quality personnel were on the scene outside the Teris facility and were considered part of the incident command structure. They provided air-monitoring information to the LEPC to assist in their decision making.

3.10 Difficulties in the Evacuation

3.10.1 Determination of the Chemical Involved

Initially, the emergency management officials did not know the chemicals that caused the explosion and fire. The fire department went through the Material Safety Data Sheets for the chemicals located at the Teris facility, determined the likely chemicals, and evacuated them based on the worst-case scenario.

3.10.2 Legal Actions

This is not a difficulty, but in one interview, it was mentioned that lawyers were filing class action lawsuits before the evacuation ended.

In addition, the sheriff mentioned that while the county jail was evacuated, he requested Teris to monitor the air quality of the jail facility in case a returning prisoner filed a lawsuit based on the evacuation.

While legal proceedings should not play a factor in an evacuation, due to the litigious nature of society, this action could eventually impact an evacuation somewhere in the future. In fact, while conducting the interviews, some information could not be provided to the interviewer due to the incident being under litigation.

3.10.3 Receipt of Information from Other Entities

The first 12 to 18 hours were smooth, but after that time, residents wanted to know when they could return home. To help facilitate the reentry of residents, the police department

waited until the EPA informed them that conditions had improved and people could return home.

3.11 After-Action Report

After the incident, there was a 3-hour session with emergency management personnel critiquing the incident. EPA, Region 6 facilitated the discussion and prepared an *Emergency Response Review—Teris LLC Explosion and Fire, El Dorado, Arkansas, Final report*, March 28, 2005. This after-action report is available in Appendix 2. The review focuses more on the response to a chemical fire than an evacuation; however, there is one observation concerning communication that has been incorporated into this report.

3.12 Special Needs Evacuations

3.12.1 Evacuation of the El Dorado County Jail Facility Incident

The Teris facility is located on the edge of the city limits, and the county jail facility is approximately 400 yards from it. The sheriff found out about the incident by either hearing or seeing the explosion and fire. The sheriff directly went to the Teris facility for information on the incident and was told of the recommendation to evacuate the jail facility. The sheriff then contacted the LEPC, and it was determined that the county jail needed to be evacuated and his staff was needed for that purpose.

When the decision was made to evacuate the jail, the sheriff called the local school district regarding school buses for the transportation of the 170 prisoners and the use of a temporary detention facility. Six school buses were provided by the school district, in addition to the offer of the use of an un-used school at Old Union, Arkansas, built for 400 students, approximately 8 to 10 miles away,

Prior to the school buses arriving, the sheriff's staff, through an earlier purchase, cuffed each of the prisoners with plastic handcuffs currently being used by American troops overseas.

The evacuation took approximately 1 hour.

The school buses arrived and the prisoners boarded with a police escort of 12 police cars. At the school, the prisoners were placed in the school gym, since it could accommodate a large crowd, and were separated in order to maintain control.

While the county jail was being evacuated, the sheriff determined that the facility still needed to provide dispatch services to the community. The sheriff and one deputy remained at the office to man the phones, while the other remaining staff of 59 was evacuated. At this time, the ventilation was turned off at the jail facility to ensure that contaminated air was not brought in from outside.

After approximately 6 to 8 hours, the sheriff determined that the situation was not as bad as it initially appeared and asked for volunteers to return to help operate dispatch. A few staff volunteered to return.

The sheriff knew that the prisoners could not be kept in the school gym overnight, so he contacted another sheriff in Farmerville, Louisiana, to ask if they had enough space to accommodate the prisoners overnight. They did, and the prisoners along with their jailers were transported approximately 30 miles to Louisiana. The sheriff felt that there was no close-by Arkansas jail facility that could accommodate the prisoners.

The next day, the all clear was received from Teris, and the prisoners and jailers returned to El Dorado. However, the sheriff brought back the prisoners before the public was allowed to return because he did not want to have the prisoners on the road with the general public due to the possibility of an incident.

The sheriff's impressions of the experience were "No failure in the mission, protected the prisoners and took calls from the community, while the jail was evacuated."

Transportation Impacts

When the sheriff decided to evacuate the jail facility, a choice of which roadways to use was also made. It was determined that the convoy would proceed down state roadways rather than county roadways due to several factors: (a) the state roadways were felt to be more secure; (b) there were wide shoulders and, in case of an accident, the buses could be moved off to the shoulder or, in the case of an automobile accident, the automobile could be moved off to the shoulder not impeding the movement of the buses; and (c) there are more lanes allowing for faster speeds and for movement past an accident.

Lessons Learned

There were some lessons learned regarding "little bitty things such as how to coordinate prisoners and separate them and secure them."

After the evacuation of the jail facility, the sheriff looked into the feasibility of providing a separate air supply for the emergency dispatch center, but it was determined to be too costly. However, approximately four to five self-breathing apparatuses were purchased and are on site at the county jail in case of need.

Why a Success

The sheriff felt that there has always been the threat of an evacuation and he had "years to think about it." He communicated the plan with two others on his staff, the chief deputy and the jail administrator, so they knew what to do in case the sheriff was incapacitated. To ensure that someone is available who knows the plan, the sheriff requires that all three persons are not off duty at the same time. There is at least one of them on site at all times. The sheriff realizes that the evacuation plan should be written down and taught to others of his staff, but this may not happen in the foreseeable future due to a lack of resources.

3.12.2 Evacuation of Nursing Homes

During the initial phase of the incident, the LEPC was contacted. The chair of the LEPC knew that, due to the location of the Teris facility and the plume, nursing homes would need to be evacuated. This started the evacuation process for the two nursing homes impacted.

Hillsboro Manor Nursing Home (Hillsboro)

The director of nursing received a page from the 911 system while attending church and was told to: (a) be prepared to evacuate and (b) prepare for a return call to evacuate. After this initial contact, Hillsboro started to evacuate the residents before the order to evacuate was received. Shortly thereafter, a call was received to evacuate the nursing home. Upon arrival at the nursing home, the director coordinated the evacuation of residents and staff.

Transportation

In the meantime, the police department and volunteers from the community acquired buses for the transportation of residents to their designated public shelter. There were approximately 96 patients and over 50 staff that needed to be evacuated. Most of the residents could be moved by either school or church bus (regular and wheelchair accessible), but residents who could not walk were transported by ambulances to the hospital or other nursing homes.

One man from a church brought a truck that was used to move wheelchairs, bedding, linen, the medicine carts, and food prepared for lunch.

The police department provided an escort to the public shelter.

Timeline

The evacuation started at approximately 11:00 and by 13:00 was completed. However, due to possible explosions at the Teris facility, residents were not allowed to return to Hillsboro until the next afternoon.

Drills/Practice

Hillsboro conducts an annual emergency response drill. With this drill, procedures are followed and steps are taken to complete an evacuation of the home without an actual evacuation.

In the past, parts of the home have been evacuated due to smoke or electrical issues, but never on a full-scale evacuation basis.

Focus

The focus during the start of the evacuation was to get patients out of the home, and gather up bedding, linen, other items, and food. The supervisor of housekeeping was charged with gathering linen, bedding, medicine, and other items. Others were charged with gathering toiletries and adult diapers. The kitchen staff was charged with gathering up formula and food. According to the Director of Nursing, "everyone was assigned a job and everyone completed it well."

During the evacuation, the focus was on trying not to upset the residents, contacting family members, and not fielding calls from outside the facility. Some of the residents do not take well to strangers and a break in their routine, so they needed to be reassured. In addition, staff were assigned to contact families to inform them of the situation. People were asked to defer calling the facility until the evacuation was completed since it interfered with the evacuation.

After arrival at the public shelter, the focus was on contacting the Red Cross for the cots, setting up the cots, and feeding and calming the residents. During the evacuation,

residents were told that there was a fire and it was better to leave the nursing home. Some residents thought of it as a picnic outing since some do not get out often.

Public Shelter

Hillsboro was directed to a public shelter in a church located a few miles away from the nursing home. When the residents and staff arrived at the public shelter, the Red Cross was contacted for cots and Wal-Mart was contacted for pillows and blankets for the evacuees.

Two to three residents were picked up by their families during the initial evacuation, but when they found out where they went and the level of comfort achieved, the residents were returned to the public shelter and the care of the nursing home.

During the evacuation, homebound citizens and other citizens in need were taken into the public shelter and treated like the nursing home residents.

Initially, the director was informed that the public shelter they were to go to was the Municipal Auditorium. The director sent staff as part of the first team. In the meantime, she voiced concern over the facility due to the location of bathrooms (not on the same level as the sleep facilities) and the lack of a place to cook food. They listened to her advice, and the evacuation point was moved to a church. The first team staff was contacted and informed of the new location.

Police officers were assigned to stay with the residents at the public shelter. They stopped curious people from entering the facility and provided security. At least two officers spent the night at the public shelter.

Lessons Learned

Lessons learned include:

- Be prepared and delegate responsibility to others to help during an emergency.
- Give people a designated assignment.
- Have drills and know what everyone's role is.
- "It was a good experience; something deadly could have happened. It makes you understand and appreciate who you rely on. Take care of your own."
- Next time, request wheelchair lift-equipped buses. This type of equipment facilitates the entry and exit of the residents onto and off the buses.
- Through firsthand experience, Hillsboro knows its own abilities, which churches have what form of transportation, and who to contact first.

Why a Success

There are numerous reasons why the evacuation was a success:

- Community volunteers assisted in the evacuation, such as by providing a truck to transport items or church buses to transport residents and staff.
- There was easy access to transportation.
- Hillsboro had written procedures on evacuations. The nursing home had practiced, at least annually, an emergency drill for evacuation of the nursing home.
- The delegation and assignment of activities to staff kept the staff focused on the evacuation and not on what-if scenarios.
- There was the experience of previous partial evacuations.

Oakridge Nursing Home (Oakridge)

At 9:30 on Sunday morning, the assistant administrator was contacted at home and informed by the 911 system that the Teris plant was exploding. Within 10 minutes of the phone call, the assistant administrator arrived at the nursing home. At this point, it was decided to start shelter-in-place procedures.

The air conditioning was turned off, windows and doors were closed, and the building was secured. In preparation for an evacuation, staff were instructed to get residents out of their rooms, place them in the hallway, and place wet towels in the doorways to prevent contaminated air from coming into the facility. Residents that were bed ridden were moved to the front of the line, while ambulatory residents were moved to the back of the building where they were met with buses.

After this initial activity, the assistant administrator was waiting for the word to evacuate Oakridge. Approximately 1 hour after the initial call, someone from a church arrived to help Oakridge evacuate. This individual informed the assistant administrator that "everyone was evacuating," and the evacuation started at this point.

A business partner of Oakridge offered the use of his church as an evacuation facility. This facility was located 5 miles away and has an auditorium, a restroom, and a kitchen facility. Residents were evacuated to this location. However, not all residents were evacuated to the church; a few residents were evacuated by ambulance to the hospital or another nursing home due to their condition.

Since the church did not have cots, staff went to a former nursing home, 17 miles south of town, and carried away the beds from that facility.

The evacuation took approximately 2.5 hours for 176 residents and 100 staff.

Concerns

The assistant administrator was concerned that Oakridge did not receive an official call to evacuate the facility. He feels that it may have been due to a mistake in their address, which is on Hudson, and the Hudson Memorial Nursing Home may have received the notice to evacuate by mistake. However, the Hudson Memorial Nursing Home was contacted, and no evacuation call was received at that nursing home.

There was no official call from the local emergency management officials for an evacuation, nor were there Red Cross officials assisting in the evacuation. The assistant administrator would have liked to have emergency officials helping during the evacuation: "If not for the churches and family members, we would have had a problem."

The assistant administrator would have liked to know whom they could call on and who would call on them in case of a next time. He did not like volunteers informing him of the need to evacuate. There needs to be "better communication from an official person." He called after the incident and received an apology.

Focus

At the beginning of the evacuation, the focus was on "do we shelter in place or evacuate?" There was no worry about Teris exploding, but there was worry about the fumes since Oakridge is located 5,000 feet from the Teris facility. In addition, the focus

was on keeping the communication lines open since people were calling in seeking information and tying up the telephone lines.

During the evacuation, the focus was on the safety of the residents and the transportation of the wheelchair-bound residents. There was a concern with the slowness of the ambulances used to transport the wheelchair-bound residents.

During the evacuation, volunteers arrived and helped transport ambulatory residents to the church.

After the evacuation, the focus was on making residents comfortable and taking care of them. Staff volunteered to come in and help, and there was a concern to make sure that the facility could handle the crowd.

Procedures

There are written procedures for the evacuation of the facility, and they may not have been followed. However, Oakridge self evacuated, and it went smoothly without injury or death.

Every month, a fire drill is practiced at Oakridge, along with semi-annual disaster drills for tornadoes and a shelter-in-place scenario. In addition, the county has a tape on sheltering in place, and the video has been seen several times by the staff and is incorporated into their training.

Shelter

Oakridge has a contract with a church up the street for evacuation purposes in case of a fire or a tornado. However, since the church was in the evacuation zone, residents could not be evacuated to that site. Upon re-examination of their needs after the incident, Oakridge determined that the facility was not big enough for them.

Transportation

A total of six church and school buses were used to evacuate the residents. One of the school buses was wheelchair lift-equipped, and Oakridge could have used more of those types of buses.

Lessons Learned

Lessons learned include:

- Examine the space of a facility to be used as a shelter and ensure it meets your needs for space, accommodations, restrooms, and a kitchen.
- Not everything needed for an overnight evacuation was taken initially, such as diapers, supplies, and feeding pumps. Rethink the need to gather up supplies during an evacuation and have assigned staff to gather up the supplies.

Why a Success

Oakridge staff have received training on evacuation and reviewed the shelter-in-place video. That information combined with the knowledge of how to handle other types of emergencies led to a successful self-evacuation.

3.13 Best Practices

The following information describes best practices that were used during the El Dorado evacuation:

- Inclusion of local industries in the local emergency planning committees and meeting on a regular basis
- Presentation of public information as quickly as possible and the involvement of as many entity representatives as possible in the press briefings (During the press briefings for the El Dorado incident, representatives from Teris informed the public of their mitigation plans.)
- Placement of an incident command quickly
- Pro-active LEPC that goes into schools and nursing homes
- LEPC provides a video on how to shelter in place (One of the nursing homes mentioned the video and has incorporated it into its staff training.)
- Use of a unified communication voice
- Use of an incident command.

3.14 Lessons Learned

Several lessons were learned from the El Dorado incident.

Activate LEPC Members Early in the Incident

Based on the nature of the call, the evacuation personnel of the LEPC could have been notified of the need to report to the incident commander. For the next emergency, personnel may be activated quickly, whether they are initially needed or not.

Adopt a Neighborhood-Specific Early Warning System, if the Budget Allows

The current early warning system is citywide and not neighborhood specific. A warning system that can be used to warn specific neighborhoods could have been helpful. However, this is budget dependent.

Be Careful in Selecting Roadways for the Transportation of Prisoners

The selection of a roadway to transport prisoners can be dependent upon the characteristics of the roadway such as additional lanes and wide shoulders, which allow for the removal of accidents and no impedance to the flow of prisoner transportation.

Keep a Current List of Media Contacts and Include Alternate Numbers

The LEPC is working with the local broadcast outlets to determine procedures for advising citizens of emergency situations 24 hours a day, 7 days a week. As a result of the incident, the contact list for the media has been revised to include cell phone and pager phone numbers of the media contacts, rather than the station phone number.

Keep Current with the Emergency Management Plan

Several of the emergency management entities have received the All Hazards Emergency Management Plan but may not have been very familiar with it. Based on the El Dorado incident, the emergency management plan was “dusted off and reviewed and entities may be reviewing it periodically.”

Know the Location of Specialized Equipment to Transport Nursing Home Residents

Emergency management officials had never evacuated two nursing homes to the scale of the El Dorado incident. It was determined that nursing home residents require specialized transportation equipment such as wheelchair lift-equipped vehicles. After the incident, Union County Emergency Management was contacted by the Central Arkansas Developmental Council who said they could provide motorized wheelchair-lift vans in the future. As expressed, "it would have been better to have known about the resource before the incident." The use of the specialized equipment and the offer of equipment will be taken into consideration for the next incident that involves the evacuation of nursing home residents.

Review Incidents (Including Others) for Lessons to be Learned

The LEPC is reviewing and evaluating the All Hazards Emergency Plan and will revise/tweak it accordingly. In addition, emergency personnel assisted in the Hurricane Katrina evacuation. When the emergency personnel returned, the LEPC leadership talked with the personnel to get their experience and, based on this information, did a self-assessment of the local emergency plan. They determined what could be revised based on the Katrina experience.

Test the Emergency Plan to Determine Whether It Works

The emergency plan was tested, and it worked. The experience of the incident resulted in a feeling of one more large incident they were able to successfully handle, and it helped instill confidence in the younger employees.

Use Reverse 911® to Alert the Community

Currently, the City of El Dorado does not have a functioning automatic notification message system. The city purchased a system that is unable to perform, and is pursuing litigation against the firm. The hope is that a system would be available for the next emergency.

Use the National Incident Management System

Use an incident management system for an incident. This was the first time that the national incident management system was used in El Dorado, and it was felt that the emergency management entities learned that the system would work.

Utilize a Unified Information Center

Initially, Teris established a communication center at a local hotel and the incident command established one at another location. Eventually, the two communication centers were unified into a single information center.

3.15 What Worked and What Did Not Work

3.15.1 What Worked

Ability to Adapt to an Ever Changing and Growing Incident

Everyone agreed that while they have practiced drills in the past, the evacuation exceeded their practice sessions. While the incident exceeded the scale of past exercises, the local emergency management organizations were able to adapt to an

ever-changing and growing incident. Based on their training, a successful coordinated evacuation response was achieved.

Establishment of an Incident Command Quickly

An incident command was established quickly, and all entities understood their roles, cooperated, and executed their missions. There appeared to be no internal bickering among the emergency management entities.

Information to the Media and the Public

Information was distributed to the media and they, in turn, communicated to the public the ever-changing, unfolding incident. The public was kept informed of the conditions at the Teris facility and actions taken to correct it and allow for the safe reentry of residents.

One Person in Charge and Delegation of Responsibilities

The nursing homes have written emergency procedures and have had partial evacuations in the past. While the nursing homes have practiced evacuations, they have not been on the scale of the January 2005 incident. Success can be attributed to one person being in charge of the evacuation and knowing what needed to be done, delegation of responsibilities to others, and the cooperation of community volunteers.

Practice and Experience of Various Entities

The practice and experience acquired by the LEPC and participating entities, along with the cooperation of all entities, resulted in a successful response to an incident that was beyond the practices to date.

Preplanning of the County Jail Evacuation

There are no written procedures for the evacuation of the county jail or for who should be contacted for the provision of transportation and temporary and overnight detention facilities. When the decision was made to evacuate the prisoners and the staff, calls had to be placed to find transportation services, a temporary detention facility, and an overnight detention facility. Despite the lack of written procedures, the evacuation of the county jail succeeded due to preplanning of this situation by the county sheriff.

Preplanning, Training, and Drills

As one interviewee comments, "Preplanning and drills helped achieve a successful evacuation." Also, the incident occurred on a Sunday morning, when emergency management entities are not fully staffed. Another interviewee commented "on weekends, there are normally skeleton staff; however, the evacuation worked well...No one was seriously injured or killed."

State of Readiness of the LEPC and Knowledge of an Eventual Major Disaster

The LEPC is an engaged entity within the community and has the foresight to know that eventually a disaster like this will happen. The LEPC is at a state of readiness and conducts training for an eventual community major disaster event.

Training Received, Frequency of Disaster Drills, and Experience Gained From Frequent Actual Disasters

The consensus based on the interviews was the evacuation succeeded because of the training received; the frequency of disaster drills, including a mass evacuation scenario;

and experience gained from frequent actual disasters. For example, there have been partial evacuations of the city in the past, one due to an ammonia leak. However, the partial evacuations were never on the scale of the January 2005 incident.

3.15.2 What Did Not Work

Acquisition of Information from Others

There was a certain amount of frustration from emergency management staff on the ground, which had to acquire information from either the State Department of Air Quality or the EPA. Information from the two entities sometimes appeared to be slow in coming. Information from the on-site State of Arkansas hazardous material inspector flowed thorough Little Rock before being passed along to officials in the incident command.

No Official Evacuation Notice to a Nursing Home

There was no official notice given to the Oakridge Nursing Home of the need to evacuate, so they did not have a designated location to receive the patients and staff when they self-evacuated.

3.16 Improvements for Next Time

The El Dorado incident response was a success, with two nursing homes and a county jail being evacuated without injury or death. However, some improvements have been identified based on the incident as follows:

- Ensure contact numbers for all institutions such as nursing homes, assisted living centers, and hospitals have the latest contact information. Confirm and periodically update the contact information.
- Have written evacuation procedures for the county jail that are available for the staff and incorporate the procedures into the training of new staff. Include information in the procedures on who can be contacted for the provision of transportation, temporary detention facilities, and overnight detention facilities.
- Have one entity follow up on the evacuation of institutions to ensure that the proper institution was evacuated.

4 CASE STUDY #2 – Graniteville, South Carolina – Train Derailment and Chlorine Leak, January 6, 2005

This second case study concerns a train derailment and a ruptured tanker car leaking chlorine gas in Graniteville, South Carolina. This incident, which occurred on January 6, 2005, involved the evacuation of a large manufacturing facility and approximately 5,200 residents. Appendix 1 provides a listing of organizations contacted for this case study.

4.1 What Happened

4.1.1 Incident

At 2:39 in the morning of January 6, 2005, the first 911 call was received with reports of a large screeching sound, a bleach smell in the area, and respiratory distress.

The fire chief of the Graniteville, Vaucluse, and Warrentonville (GVW) Fire Department was paged at 2:40 with the report of a possible train hitting a building, but no mention of a possible chemical leak. The Aiken County Sheriff's Office and Aiken County Emergency Services were also either paged or phoned regarding the incident.

There was a head-on collision between a northbound Norfolk Southern 42-car train (25 loaded and 17 empties) and a stationary 11-car train at a recorded speed of 41 miles per hour (mph). The accident was caused when a manual track switch was left in the wrong position. After moving the train onto a sideline track, Norfolk Southern crew failed to reset the manual switch so that another train would stay on the main line. Hours later, the train that was on the main track hit the parked train on the sideline track and the train consist derailed and chemicals were released.

Initial responding agencies from Aiken County included the GVW Fire Department, Aiken County Emergency Medical Services, Aiken County Sheriff's Office, Aiken Department of Public Safety, and Aiken County Emergency Management Division.

The GVW Fire Department arrived on the scene and reported a green cloud and an inability to breathe. The fire chief was exposed to the chlorine spill while arriving on the scene, advised no entry of the immediate area and within 15 minutes of the incident, made a recommendation for an evacuation.

A hazardous materials team and emergency medical services were needed on the scene due to the nature of the chemical spill and a report of victims at the scene. The GVW Fire Department explained, "Local resources (were) exceeded very early."

It was later determined that five of the derailed cars consisted of tanker cars of hazardous materials: three cars of chlorine, one car of sodium hydroxide, and one car with a residue of elevated temperature liquid, NOS (rosin). Other materials released included clay from hopper car and diesel fuel from the locomotives. Other hazards included power lines and downed trees.

As a result of the incident, there were 9 fatalities (one in a residence, one train crew member, six plant workers, and one subcontractor while making deliveries), 552 treated injuries, and 69 patients admitted to local hospitals.

Exhibit 2 presents an approximate timeline of the incident.

Exhibit 2—Timeline for Graniteville Incident

Thursday, January 6, 2005	Event
02:39	First 911 call received
02:40	Fire, Sheriff, and Emergency Services Departments paged
03:00	Red Cross, Aiken, South Carolina contacted
03:30	Doctors Hospital, Augusta, Georgia, notified of incident
03:30	School district officials notified and decision made to close schools prior to activation of the emergency operations center
03:40	Initial news release on incident issued by Aiken County Sheriff's Office
06:00	First shelter opened in decontamination center
06:27	911 system delivers message of shelter-in-place to residents
12:00	Governor Mark Sanford declares a state of emergency in Aiken County
15:00	Sheriff imposes a curfew from 18:00 to 07:00 for Graniteville residents living within a 2-mile radius of the incident site
15:00	Sheriff's fact sheets inform residents to stay at home, close doors/windows, and turn off ventilation systems
16:00	911 system delivers message to residents to evacuate
Shortly after 16:00	Evacuation and well being checks by Aiken County Sheriff's Office
18:30	Evacuation and well being checks completed
Saturday, January 8, 2005	Pet unification plan implemented
Tuesday, January 11, 2005	Most shelters closed
Wednesday, January 12, 2005	Some schools reopened
Thursday, January 13, 2005	Some residents allowed to return home and could request a home inspection for air quality
Friday, January 14, 2005	Additional residents allowed to return home and could request a home inspection for air quality
Saturday, January 15, 2005	Additional residents allowed to return home and could request a home inspection for air quality
Tuesday, January 18, 2005	Rail line reopened; residents allowed to return to their homes and remaining schools reopened

By state law, due to the type of incident, the GVW fire chief was the incident commander. However, there is a discrepancy between the fire chief and the sheriff as to who was the acknowledged incident commander. In responding to the incident, the fire chief drove through the chlorine cloud and needed to drive off due to chlorine exposure. The Aiken County sheriff saw the need to assume command, and he did. This caused friction between both parties that was eventually settled.

The Director of Emergency Services (Director ES) of Aiken County made the decision to shelter-in-place. Initially, he was unsure what the gas was, but suspected chlorine. Later, in consultation with others at the incident command center, based on interviews, it was either the fire chief or the sheriff who made the decision to evacuate.

A unified incident command system was established, but there was difficulty in pinpointing when this occurred.

Due to the nature and extent of the incident, assistance was provided by 111 agencies ranging from the GVW Fire Department, Aiken County Sheriff's Office, Aiken County Emergency Services, South Carolina Emergency Management Division, South Carolina Highway Patrol, United States Coast Guard (Coast Guard), American Red Cross, Aiken COBRA team, and City of Aiken Animal Control. A listing of the entities involved, from the Sheriff's Office Web site, is located in Appendix 3. Approximately 600 federal, state, and local personnel participated in the response to this disaster.

4.1.2 Evacuation

911 System

The 911 center received calls from residents of smoke and gas coming into their homes. Residents were told if they could safely leave their homes to drive to Aiken, South Carolina. There was a mix of people leaving and others sheltering-in-place.

In addition, the train derailed next to an Avondale Mills facility. Plant workers received exposure to the chlorine, requested assistance from 911, and were told to leave work.

The Aiken County 911 system used a Reverse 911® to contact residents and businesses about the incident. The 911 system was used to inform residents in the 1-mile zone of the need to shelter-in-place on the morning of the incident; but, at 16:00, the system was used to inform residents of the need to evacuate.

Avondale Mill Employees

While unable to talk to personnel at Avondale Mills, the literature search conducted for this project revealed that workers banded together to evacuate the facility and flee the area.

Days Sheltered

Out of the residents evacuated, 5,400 were sheltered for 5 days and 200 were sheltered for 9 days. Industry and retail businesses were shutdown for 9 days.

Evacuation and Well-Being Checks

After the order was received to evacuate within 1 mile of the incident site, 100 two-person teams went into the evacuation zone to conduct evacuation and well-being checks. Approximately 100 to 200 people refused to leave their homes. The checks were completed by 18:30 because the sheriff wanted the people out before dark.

Expansion of Evacuation Zone

Approximately 5,400 residents were evacuated within a 1-mile radius of the incident area. There was a discussion about extending the zone to 3 to 5 miles due to the concern with secondary release from two additional derailed cars. The Coast Guard Strike Team convinced local officials that they were comfortable with recovery activities and the 1-mile zone was sufficient. This decision was made 2 to 3 days into the incident.

Immediate Area

The immediate area (300 yards) was initially evacuated and shelter in place was implemented for a 1-mile radius. At the incident command center, there was a discussion on whether to shelter-in-place or to evacuate.

The initial evacuation zone was determined based on the Department of Transportation Emergency Response Guide and was used to provide a protective isolation distance. Early maps were used to identify the evacuation area, based on previous mapping information for criminal investigations and fire responses.

People without Transportation

Based on the literature review, residents without transportation were not necessarily evacuated. In the *San Francisco Chronicle* article “Deadly Chlorine Gas Gone—But Fear Hangs Over Hard-Hit Town Some Residents Warily Return Home After Train Wreck” reported: “Rhonda Smith described gazing out at emergency workers whizzing back and forth in safety suits, and waking her children to tell them she loved them. She had no car at her house and was waiting for somebody to stop by to ask if she was safe; no one came until more than 18 hours after the crash. ‘I don’t even know how to explain the feeling,’ she said.”

Roles and Responsibilities

Aiken County Emergency Services was responsible for the operation of the emergency operations center and the evacuations, while the GVW Fire Department was responsible for management of the chlorine leak and the Aiken County Sheriff’s Office was responsible for traffic control and law enforcement. Roadblocks were quickly established to limit access to the evacuation zone.

Interview Impression

The impression received from all of the interviews was the general public was on its own when evacuating. Apparently, ambulances and school buses were sent out to assist in the evacuation, but no interviewee knew if and how they were used. In the Sheriff’s Fact Sheet of January 6, 2005, for 19:00, it states, “those without vehicles were transported by school buses to area shelters.”

The police went door to door to communicate the need to leave the area, but residents were not directed to any particular shelter, only of the need to leave immediately.

4.2 Community

The community of Graniteville, South Carolina, is unincorporated and resides within Aiken County. There are approximately 12,000 residents in the area, which also includes the unincorporated communities of Vaucluse and Warrentonville.

Aiken County is located on the South Carolina-Georgia border, across the Savannah River from Augusta, Georgia.

The area of Graniteville, Vaucluse, and Warrentonville (GVW) has commercial and industrial facilities and includes eight divisions of Avondale Mills (textile manufacturer), the Sage Mill Industrial Park, SKF USA (roller bearings manufacturer), and Bridgestone/Firestone (tire manufacturer).

The community is served by the GVW Fire Department, which is all volunteer, with a total strength of 45 to 50 personnel. Personnel are alerted to calls by the Aiken County 911 dispatchers via voice pagers. In the event of 911 dispatch interruptions, the department has the capability to dispatch from the GVW Fire Department headquarters. However, during the Graniteville incident, the headquarters facility was in the incident zone and not available for use.

The community is also served by the Aiken County Sheriff's Office and the Aiken County Emergency Services Department.

4.3 Focus

Questions were asked regarding the focus at the beginning of the evacuation, during the evacuation, and after the evacuation. The purpose of the questions was to determine how the focus of an incident changes as the incident evolves. Predominately, the focus at the beginning of the evacuation was getting the residents out of harm's way and making sure the public was safe.

During the evacuation, the focus varied depending on the position of the interviewee. Responses varied from:

- Concern with elderly residents who did not have a way out of the evacuation zone – GVW Fire Department
- Ongoing concern with the safety of the residents and employees at Avondale Mills – Aiken County Sheriff's Office; people who passed out and could not evacuate – GVW Fire Department
- Transportation of people to the hospital with symptoms of respiratory problems – Aiken County Emergency Services.

After the evacuation, responses varied from:

- Animal rescue from the evacuation zone – GVW Fire Department
- Closing of schools in the area – Aiken County Sheriff's Office
- Making sure everyone was accounted for – GVW Fire Department
- Review of a need to extend the evacuation zone due to the overturned tanker car and possibility of an additional release. However, the Coast Guard Strike Team convinced local officials that the 1-mile zone was sufficient – Aiken County Emergency Services
- Search and recovery from the four textile facilities. There were reported deaths within the facilities – GVW Fire Department.

4.4 Transportation Impacts

There appeared to be little impact to the transportation system due to the Graniteville incident. The Aiken County Sheriff's Office cordoned off the evacuation zone, and traffic was rerouted through the community. The main thoroughfare (Aiken/Augusta highway), a four-lane roadway connecting Aiken, South Carolina, to Augusta, Georgia, was closed for over a week, but traffic was rerouted through the area onto parallel roads or Interstate 20.

4.4.1 Evacuation Zone

Roadblocks were established around the incident zone and a curfew (dusk to dawn) set to stop unauthorized people from entering the zone.

“Access [was] controlled early through traffic control points established quickly and efficiently due to recent training. Locations [were] determined based on major intersections and information received from 911 distress calls within first 15 minutes. Roadblock placement [was] reevaluated within first 30 minutes, and determined to be adequate based on wind direction and HazMat input” as reported in the *Aiken County Sheriff's Office After-Action Report*.

4.4.2 Receipt of Train Manifest

The manifest from Norfolk Southern was available to fire and police either in 30 minutes or up to 2 hours from the time of the incident. Interviewees expressed cooperation from the railroad in identifying the chemicals.

4.5 Advance Planning and Preparation

4.5.1 Drills and Incidents

Drills and practice were mentioned to have occurred in Aiken County, but not on the scale of the Graniteville incident. There have been large structure and wood fires that have allowed the actual experience of emergency preparedness. Monthly drills are conducted with as many local emergency management entities as possible. For example, in October 2005, Aiken County conducted a weapons-of-mass-destruction exercise. In addition, the sheriff's COBRA team participated in a statewide drill last year in Columbia, South Carolina.

On the Local Emergency Planning Committee Web site is a section on drills and exercises. The only report listed is the *Aiken/Barnwell County Transportation Emergency Preparedness Program Exercise Report ABTEPP 2001 Multiple Vehicle Accident Involving Radioactive Materials on Aiken and Barnwell Counties Line*.

However, during the interviews, there was no resounding response that the entities, at least the local major players, have conducted drills or practices together. There are drills and practices, but they appear to be independent and not on a coordinated local level. This particular comment has appeared in two of the three after-action reports on the incident.

4.5.2 Emergency Preparedness Plan

Aiken County has an All Hazards Emergency Plan. However, during the interview process, there was no real mention of the plan or its relevance to the incident.

4.5.3 Preplans

The GVW Fire Department has written plans that were used for searching the Avondale Mills facilities. The GVW Fire Department also walks down all Avondale Mills facilities annually to re-familiarize them with the layout.

4.5.4 Public Shelters

Five public shelters were set up for the Graniteville incident. The first shelter was established at approximately 06:00 at the decontamination center located on the University of South Carolina-Aiken campus in the gymnasium parking lot. Approximately 300 to 400 residents registered at the shelters out of the more than 5,400 residents. It was felt that most of the evacuees stayed with family, friends, and local hotels and motels.

Four days into the operation, the railroad placed evacuees in hotels and motels, and within five days of the incident, the public shelters were closed.

4.6 Communication

4.6.1 Communication between Agencies

The overall impression is communication was successful between all entities; however, the Red Cross did mention that they felt they received information from the newscast, rather than being directly contacted with the information.

In addition, the *Aiken County Sheriff's Office After-Action Report* did mention initial incompatible radio frequencies. Radio systems, landlines, and cell phones were the main means of communication. However, one interviewee mentioned the possible use of an 800 MHz trunk system that could be used by all parties next time.

The incident command center was the designated recipient of information, and the entities, in turn, contacted their staff via their communication systems. Some specific observations based on the interviews and/or the after-action reports are identified below.

Daily Briefings

At the incident command center, briefings with written objectives were conducted at least twice a day. The status of the previous days objectives were updated at each briefing.

GVW Fire Department Communication

The GVW Fire Department used its radio system (VHF or UHF) and Nextel walkie-talkie to communicate. The fire frequency is a shared radio frequency.

GVW Fire Department Dispatch

In the *GVW Fire Department After-Action Report*, there were two improvement items noted for communication. First "[fire] dispatch should provide more detailed information on location of victims requesting assistance." Second, "[fire] dispatch should coordinate received information between positions for distribution to all agencies."

Incident Command Communication

A local building was designated as the incident command center, and phone communication, both landline and Internet capability, had to be installed by Aiken County communication staff. It was established as a priority.

Law Enforcement Communication

The majority of the law enforcement community has an 800 MHz radio system or access to it.

State of South Carolina

Initially, “incident information was not adequately shared among responding agencies due to incompatible radio frequencies” as reported in the *Aiken County Sheriff’s Office After-Action Report*. However, the State of South Carolina provided additional communication capabilities through an 800 MHz radio system.

Support Agencies

In the *Aiken County Emergency Services After-Action Report*, it was noted that “all support agencies (Salvation Army, Red Cross, South Carolina Department of Social Services, etc.) were not kept informed of recovery status. Although daily status meetings were held at the Unified Command Post, the information was not communicated with the Emergency Operations Center.”

4.6.2 Communication to Evacuees and the Public

Means of Communication

The main means of communication to the general public was the use of Reverse 911® and local broadcasts on television and radio.

After the evacuation, a media area was established near the incident command post. The Aiken County Sheriff’s Office scheduled and conducted media briefings frequently. A Spanish interpreter was provided to communicate emergency information to the public.

Nightly town hall meetings were conducted to discuss relief efforts, impacts, pet concerns, progress, and reentry concerns. Norfolk Southern, the Red Cross, and mental health entities were invited to attend.

2-1-1 System

A new 2-1-1 system was used to provide information to evacuees on the social services available to them. The Salvation Army/United Way manned the telephone line and was a “talking human resource directory” for residents of the community. Information ranged from what we can do to help, to what agencies can help, to where we can go to get food. The 2-1-1 system moved phone traffic away from the 911 system and allowed the 911 system to remain open for emergency use.

The 2-1-1 system for Aiken County “received calls immediately but had no info[rmation] to provide initially. 2-1-1 received updated information via television news report. As a result, 2-1-1 personnel did not learn key information such as the shelter-in-place message that had been transmitted to residents” as reported in the *Aiken Emergency Services After-Action Report*. In addition, 2-1-1 is not accessible via cell phone.

Fact Sheets

The Aiken County Sheriff’s Office prepared fact sheets for almost every day of the incident informing the public of the incident, what was happening, what was to be done, etc. A sample fact sheet is found in Appendix 4.

In cooperation with the State of South Carolina, Norfolk Southern, and other entities involved in environmental matters, a fact sheet was prepared on “Things to do Upon Your Return Home.” This can be found in Appendix 5.

Public Service Announcements

Public service announcements were produced and broadcast to the public regarding housekeeping and food handling once residents returned to their homes.

Unified Communication

The Aiken County Sheriff's Office was the public information officer for the incident command, while the State of South Carolina Department of Health and Environmental Control was the state coordinator of information. The two entities worked together for the length of the incident.

4.6.3 Communication – Miscellaneous

Less than 100 yards from the wreck, Bell South had a switching station that served the County and City of Aiken and cell phone service. This became a top priority of Bell South to have a HazMat team from Bell South get to the switching station to make sure the equipment was working. They were afraid that the chlorine would ruin the equipment. If that happened, they could have lost communication in the county and made it difficult to communicate. Bell South was afraid of disruption of local phone service, which did not occur.

4.7 Use of ITS Equipment/Advanced Technology

During this evacuation, no advanced technology was needed, nor was the need for such technology ever expressed during the interviews.

4.8 Coordination

4.8.1 Initial Coordination

Initially, the “activation and full operation of the Emergency Operations Center was a slow process due to early hour and lack of dedicated facility” as reported in the *GVW Fire Department After-Action Report*.

Other issues noted were:

- “Accountability system (HazMat wristbands) implemented by [the] Fire Department was not communicated to all responding agencies,” as reported in the *Aiken County Emergency Services After-Action Report*.
- “Buses used for transport of evacuees were not coordinated with [the] Fire Department incident command,” as reported in the *GVW Fire Department After-Action Report*.
- “Entry teams from other agencies [were] not coordinated with [the] Fire Department incident command during [the] early hours of [the] incident,” as reported in the *GVW Fire Department After-Action Report*.
- “Local/National Red Cross point of contact needed at the Command Post to coordinate food for personnel in outlying areas,” as reported in the *Aiken County Emergency Services After-Action Report*.
- “No coordination between [the] Fire Department and Emergency Services during [the] initial incident response,” as reported in the *GVW Fire Department After-Action Report*.

- [The] “lack of coordination between Emergency Operations Center and [initial] Command Post affected logistics, food deliveries, housing, etc. [The] Command Post was duplicating effort, and info[rmat]ion wasn’t being shared effectively,” as reported in the *Aiken County Emergency Services After-Action Report*.

Initial coordination appeared to be slightly disjointed due to the discrepancy between the fire chief and the sheriff as to who was the acknowledged incident commander. However, after establishment of the incident command and the realization that there should be no more additional loss of life, the entities then worked as a group with a mission to accomplish. Interviewees mentioned that the entities involved worked well together, cooperated, and functioned as a team eventually. In the *GVW Fire Department After-Action Report*, it was noted “effective coordination between [the] Fire Department and [the] Emergency Services occurred several hours into [the] incident.”

Also, as noted in the *GVW Fire Department After-Action Report*, the “Incident Command System process [was] not followed by all responding agencies.” So while the incident command system was acknowledged as working among the interviewees, it apparently was not fully utilized during the Graniteville incident.

4.8.2 Additional Resources

The GVW Fire Department activated the South Carolina Mobilization Plan, which allows for a coordinated request for support resources and agencies. Firefighters from around the state and out of state participated in the incident. The fire chief felt it worked well.

The Aiken County Sheriff’s Office has mutual-aid agreements for additional response entities. In addition, as reported in the *Aiken County Sheriff’s Office After-Action Report*, the “Sheriff contacted neighboring County Sheriffs directly via cell phone to coordinate safe arrival direction to staging area.”

The Aiken County Emergency Services also called in resources. As reported in the *Aiken County Emergency Services After-Action Report*, “Aiken County Emergency Management Division initialed early request for assistance from [the] South Carolina Emergency Management Division (SCEMD). 75% of State Emergency Support Functions were activated.”

4.9 Decision Making

A unified incident command system was established and most organizations involved in the incident had representatives at the command center, including local, state, and federal entities. Meetings were held at least twice a day and possibly more.

There is no dedicated emergency operations facility for Aiken County, and as a result, the incident command center was moved several times during the incident.

4.10 Difficulties in the Incident/Evacuation

The GVW Fire Department headquarters was out of service due to its location within the evacuation zone. It is located within 300 feet of the incident. Apparatus and equipment located at the headquarters was exposed to chlorine vapors and considered a total loss.

As a result, the siren system that could have been used to alert residents was not operational. Fire coverage was provided from Fire Station 2.

4.11 After-Action Reports

Three after-action reports were created for:

- Aiken County Emergency Services (Appendix 6)
- Aiken County Sheriff's Office (Appendix 7)
- GVW Fire Department (Appendix 8).

The focus of the after-action reports was the response to the Graniteville incident by all three entities. Some of the observations are applicable to an evacuation and are cited throughout this section.

4.12 Special Needs – Pets

Residents who evacuated left behind their pets. When it was determined that the evacuees would be away from their homes for days, a plan was instituted to reunite people with their pets within 2 days of the incident. The Aiken County Animal Control Department called on other animal control departments to assist in entering the affected zone and retrieving the pets. To accomplish this, the evacuees had to contact animal control and provide information on their pet and keys to their home. With this information, animal control retrieved the pets and took them to a local high school. Pet owners had to make an appointment to pick up their pets. More than 287 pets were reunited with their owners.

Prior to the development of the plan, the Aiken County Sheriff's Office and Aiken County Animal Control placed food and water on the streets for the pets. Animals were seen eating and drinking at these locations.

4.13 Best Practices

The following information highlights some of the best practices that were used during the Graniteville incident.

- A unified incident command system and daily meetings
- The 2-1-1 system for human services and volunteer services
- A pet reunification plan
- Fact sheets and press briefings
- Town hall meetings.

4.14 Lessons Learned

Several lessons were learned from the Graniteville incident.

Activate the Reverse 911® System at Incident Command

“Reverse 911® was not activated in a timely manner due to access available only by emergency management personnel. This weakness has been corrected so that Reverse 911® can now be activated through direction from the dispatch supervisor or

authorization of the incident commander. Capability will also be established at North Augusta Public Safety and Aiken Public Safety dispatch centers,” as reported in the *Aiken County Emergency Services After-Action Report*.

Determine Levels of Protection Prior to Entry of Incident Zone

The GVW Fire Department feels that verification of levels of protection is needed prior to entry into the incident zone. As reported in the www.chemicalspill.org Web site article “Emergency Response Issues: What Went Wrong in Graniteville,” “emergency responders from the local volunteer fire department responded to the train crash and subsequent chlorine release without first donning personnel protective gear.” In addition, as reported in the *Aiken County Emergency Services After-Action Report*, the “first Aiken County Emergency Medical Services unit responded directly to the scene and had to leave the area due to fumes. Entry should be coordinated with [the] incident command.”

Ensure Emergency Alerting System Is Working

“[The] Aiken County Emergency Management Division had to contact [the] South Carolina Emergency Management Division to initiate the Emergency Alerting System (EAS), which only works if [a] radio station is in auto position. Aiken County Emergency Management Division did not have [EAS] monitoring capability to determine if [the] EAS message had been transmitted to citizens,” as reported in the *Aiken County Emergency Services After-Action Report*.

Ensure the Reverse 911® System Has Current Information

After the Graniteville incident, it was determined that the phone directory for the 911 system was approximately 5 years old and did not include unlisted numbers or cell phone numbers. Since then, an updated phone directory has been purchased since many people no longer have landlines for telephone service.

Provide Additional Training on Hazardous Materials

The GVW Fire Department learned that while they were able to respond to the incident, additional training was needed on hazardous materials for the next time. “Emergency responders from the local volunteer fire department responded to the train crash and subsequent chlorine release without first donning personnel protective gear,” as reported in the www.chemicalspill.org Web site article “Emergency Response Issues: What Went Wrong in Graniteville.”

Provide for Additional Multi Entity Training

The “Fire department believes that multiple agency response drills would be beneficial to future responses,” as reported in the *GVW Fire Department After-Action Report*.

The *Aiken County Emergency Services After-Action Report* states, “Joint training between Emergency Operations Center personnel and Command Post responders is needed. Agencies need to understand each other’s roles and capabilities.”

Provide Your Own Public Information Officer

The GVW Fire Department felt it did not receive the credit it was due so, in the future, the GVW Fire Department will have its own Public Information Officer.

Provide Standardized Identification Badges

The GVW Fire Department felt that standardized credentials are needed for access to allow for the proper identification of authorized personnel. There was a “lack of credentials [which] caused some problems with [the] movement of volunteer responders; [the] county produced generic badges with names, but no photos,” thus causing issues with the identification of responders as reported in the *GVW Fire Department After-Action Report*.

Use Technology Tools during the Incident

Some of the local emergency response staff utilized “Blackberries” to communicate with their forward command. These devices could be used next time to text message to others in the field or up to the command center.

There was an expression of a need for Internet access in the field. “With an incident like this one, the regional and local media come on the scene to report the incident. Internet access to distribute information such as fact sheets prepared for the incident would have been helpful,” as reported by the Aiken County Sheriff’s Office Public Information Officer.

Verify Mutual Aid Sources

The GVW Fire Department feels that qualifications should be verified prior to the utilization of all mutual-aid sources.

4.15 What Worked and What Did Not Work

4.15.1 What Worked

Communication to the Public

The public was kept informed of the incident and the response to it via a unified information system and nightly town hall meetings. Communication as cited by participants was timely, accurate, and credible. Entities involved in the incident sent representatives to the press briefings and town hall meetings.

Quick Implementation of an Incident Command Center

An incident command center was quickly established after the incident occurred. A local building was designated as the incident command center, and phone communication, both landline and Internet capability, were installed by Aiken County communication staff as a priority.

Use of an Incident Command System

Initially, the implementation of an incident command system was disjointed due to conflicting jurisdictions and some confusion as to the actions by others. However, as the incident progressed, the incident command system developed and remained in effect throughout the incident. Eventually, the incident team achieved interagency cooperation.

Use of the 2-1-1 System for Social Services

A new 2-1-1 system was used to provide information to evacuees on the social services available to them. The 2-1-1 system moved phone traffic away from the 911 system and allowed the 911 system to remain open for emergency use. However, information has to be kept up to date as conditions change.

Use of the National Response Plan

This was the first time in the community that an incident utilized the national response plan. Entities understood and knew their roles and responsibilities.

4.15.2 What Did Not Work

Duplication of Effort

There appeared to be a duplication of effort between the Incident Command Center and the Emergency Operations Center as reported in several after-action reports.

Internal Bickering Over Leadership of Incident Command

Initially, there was internal bickering over the leadership of the incident command system. While this may not have impacted the actions of the incident command system, there was the potential for this to happen resulting in reduced capacity of the incident command system.

Not All Involved Entities Were Represented at the Incident Command Center

All entities did not appear to be represented at the Incident Command Center such as the Red Cross.

Staff Assignments

Aiken County Emergency Services did not anticipate that the staff assigned to Emergency Management Services for HazMat response had other duties and could not respond. However, others filled the need for a HazMat response.

4.16 Improvements for Next Time

The Graniteville incident overall had a successful evacuation of residents and mill workers; however, unfortunately, there were deaths and injuries attributed to the incident. Some improvements have been identified based on the incident.

- Direct evacuees to public shelters, if this information is known ahead of time.
- Ensure that residents without transportation are evacuated.
- Ensure the 2-1-1 system can be accessed from cell phones.
- Ensure the 2-1-1 system has all of the information needed to provide social service information to evacuees and the general public.
- Establish an incident command center without internal bickering; this may be improved through the use of regular training sessions.
- Have joint multiple-entity training including Emergency Operations and Incident Command.

5 CASE STUDY #3 – South Salt Lake City, Utah – Toxic Chemical Spill, March 6, 2005

This third case study concerns a toxic chemical spill from a leaking tanker car in South Salt Lake City, Utah. This incident involved the evacuation of approximately 3,000 residents and occurred on March 6, 2005. Appendix 1 provides a listing of organizations contacted for this case study.

5.1 What Happened

5.1.1 Incident

On Sunday, March 6, 2005, railroad workers discovered a leaking tanker car in the Union Pacific Roper Rail Yard. Approximately 6,000 gallons out of 13,000 to 15,000 gallons of liquid had spilled onto the ground, which forced the closure of nearby roads (including two interstates) and the evacuation of a neighborhood.

The railroad workers contacted 911 and told them that it looked like there may be a fire in the rail yard since there was smoke coming from a rail car. The Valley Emergency Communications Center (911) dispatched HazMat teams (both police and fire) and eight fire department units.

The South Salt Lake City Fire Department sent a battalion chief, who became the incident commander. A unified command, with the fire department in the lead, was established shortly after the 911 call. The fire department, in turn, contacted the South Salt Lake City Police Department, the Highway Patrol, and the South Salt Lake City Valley Health Department.

The on-call chief of the fire department was contacted when it was determined that the response needed to be “scaled up” to handle the incident. The tank started to fail, and the concern was the entire contents of the tank would spill onto the ground.

Between approximately 10:00 and 12:00, the tanker car started to break down further, causing concern over the structural integrity of the vehicle.

Exhibit 3 presents an approximate timeline of the incident.

Exhibit 3—Timeline for South Salt Lake City Incident

Sunday, March 6, 2005	Event
05:30	911 call received on leaking rail car from the Roper Rail Yard
05:58	Fire department units arrived on the scene
07:00	Additional units requested by the Incident Commander—Midvale Fire Department Mobile Research Unit for HazMat and Sandy City mobile decontamination unit
08:00	Union Pacific observer used the description “looks like bullet holes” and as a result, a call was made to Homeland Security—the fire department received inconsistent information on material in the rail car
09:00	Department of Public Safety helicopter provided aerial reconnaissance of the rail car
09:30	Determination that the holes were due to damage because holes were enlarging from material in tank corroding the tank walls; plans to offload the product
12:00	Incident command post moved due to plume—no line of sight to incident area
12:05	Union Pacific had equipment to offload the car; determined the approach could not be used due to deterioration of the rail car
12:45	I-15 shut down began
14:15	I-15 shut down complete
15:30	Part of the area designated for a mandatory evacuation; started

	evacuating residents; part of the area designated for a voluntary evacuation, with a shelter-in-place recommendation
17:00	Joint Information Center opened
18:00	Mandatory evacuation completed and local roads closed
20:00	Next attempt to offload rail car using snorkel and boom. First attempt ruined the pump and eventually received a pump that would not disintegrate. Acquired sample, processed on site the material, which helped plans for offloading.
23:00	Sent sample to the State Department of Health Laboratory for laboratory assay
23:00	Evacuation order rescinded
Monday, March 7, 2005	Event
04:00	Freeways open. Most of the contents of the rail car offloaded and the rest neutralized in the rail car.

The rail car was punctured to allow for the offloading of its contents. After the rail car was offloaded, it was moved by a remote-controlled locomotive to an area near the decontamination site. The Union Pacific HazMat responders lifted the car off the track and set it on the dirt. A berm was constructed around the car to contain any liquid. At this time, the incident command determined that the rail car was no longer a public safety threat and turned over control of the scene to the Union Pacific team.

5.1.2 Evacuation

The incident occurred at approximately 05:30. Once it was determined that the situation was worsening, a decision was made to evacuate residents. The incident commander made the decision to evacuate in consultation with other members of the incident command. Once the group made the decision, it notified the joint information center of the evacuation.

An evacuation plan was quickly put into place. The rail yard, where the leaking tanker car was located, is in an industrial area that on Sunday morning was basically empty of workers. However, there are residential homes within 1 mile of the rail yard, and approximately 3,000 residents were evacuated. The evacuation took approximately 3 hours to complete.

The evacuation zone ranged from approximately 1 to 1 ½ miles. Within this evacuation zone, there were no special needs evacuees such as nursing homes or jail facilities.

People were contacted with a Reverse 911® system and by the police department going door to door through the neighborhood and giving people a few minutes to gather their belongings before evacuating.

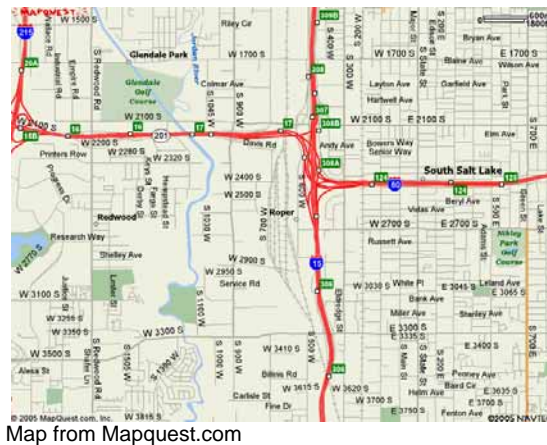
The incident commander considered the use of public transport or school buses to transport evacuees, but there did not appear to be a need for the buses, so none were ordered. People evacuated themselves with the use of personal vehicles.

Commanders from the police department and the deputy commissioner from the state patrol were on the scene and made immediate decisions. Consensus was Reverse 911® worked well for notification, and the police department and highway patrol provided a “great job overseeing, the road/freeway closures and the evacuation.”

5.2 Community

South Salt Lake City is located in the heart of the Salt Lake Valley and occupies a land area of approximately 7 square miles with the Jordan River as its west border. The city has 23,038 residents and approximately 2,400 businesses. The city is known as the “Center of Industry.”

The incident occurred at the Roper Rail Yard located close to Interstates 15 and 80, in South Salt Lake City, Utah.



Three drinking wells were located in the incident area, and as a result, one of the drinking wells is shut down for a year due to the leakage of chemicals into the ground.

5.3 Focus

Questions were asked regarding the focus at the beginning of the evacuation, during the evacuation, and after the evacuation. The purpose of the questions was to determine how the focus of an incident changes as the incident evolves. Predominately, the focus at the beginning of the evacuation was notifying people, getting the citizens out of harm’s way, and making sure the public was safe.

During the evacuation, the focus varied depending on the position of the interviewee. Responses varied from:

- Keeping the drinking wells safe with the contamination on the ground. Residents may have contaminated water when they return – South Salt Lake City Fire Department
- Keeping unauthorized people and “rubbernecker” out of the evacuated areas – South Salt Lake City Police Department
- Providing security for the evacuated area – South Salt Lake City Police Department.

After the evacuation, the focus varied depending on the position of the interviewee. Responses varied from:

- Notifying people that they could return home. They had no idea where people went, so the media was used to alert residents of their ability to return home – Police Department.
- Providing traffic control for the return of residents – Police Department.

In this incident, two interstates were closed, and as a result, the focus of the Utah Department of Transportation was on traffic management. At the start of the closure, the focus was on ensuring the interstate ramps were closed, ensuring the right ramps were closed, and determining where to put the displaced traffic.

After the interstate closed, the focus was on educating the public about the closures and maneuvering around the area. During the incident, there was a worry about impacting the Monday morning commute. The Utah Department of Transportation thought that the interstate closure may have to be moved further back (in terms of distance) to move traffic onto roadways other than a collector street. However, the interstates were re-opened before the morning commute.

At the end of the incident, the focus was on how quickly traffic management could be restored.

5.4 Transportation Impacts

The rail yard is located near the intersection of Interstates 15 and 80, which had to be closed. In addition, some local streets were also closed.

The South Salt Lake City Police Department, Department of Public Safety, and Highway Patrol were involved in the closing of the roadways. Roadways were quickly blocked with barricades and barrels.

As the neighborhoods were evacuating, at approximately 15:30 on Sunday, March 6, 2005, the local streets were barricaded with roadblocks to prevent the reentry of residents and the entry of unauthorized personnel.

At approximately 12:45 on Sunday, March 6, 2005, Interstates 15 and 80 were shut down, which took a little more than 1 ½ hours. Initially, Utah Department of Transportation resources were used to close the interstates. Once it was determined that the closure would take longer than anticipated, it was decided to utilize an authorized traffic management contractor to close down the interstate with barriers and electronic signs.

State troopers were sent to patrol and monitor the closed freeways to ensure motorists did not drive onto the roadways.

The main means of communication to the traveling public was with fixed and portable dynamic message signs, 511 travel services, highway advisory radio, and the commuter link Web site. It was felt that the notification worked well.

There was an initial backup of approximately 1 to 2 miles when the interstate was initially closed, but this was quickly dissipated. While not associated with this incident, the Utah Department of Transportation conducted a public opinion poll and 70 percent of the people polled would change their travel pattern if information was provided. After the initial closure, traffic was manageable.

5.5 Advance Planning

5.5.1 Drills – Practice

The fire department and police department are trained in the use of the national incident management system.

Drills have been conducted among the various entities involved in the South Salt Lake City incident, such as a chlorine drill prior to the Winter Olympics. The Red Cross also participates in the various tabletop exercises.

In September 2004, a drill was conducted with various fire departments and the South Salt Lake City Valley Health Department at the Roper Rail Yard with a spilled mixed laboratory waste scenario. Due to this exercise, issues were developed, identified, and resolved such as the determination that the parking lot at the Roper Rail Yard was too small to accommodate responding entities and booms/pumps could not be extended from roadways above the rail yard. The drill mimicked this March 6, 2005, incident closely.

On October 3 to 5, 2005, there was a training session with entities such as fire departments, local law enforcement, and the railroad HazMat team regarding basic rail car identification and hands-on training for a rail car using a simulated rail car. The hands-on training involves learning the operation of the rail car such as ventilation, piping, and other systems. It was held over 3 days to allow for all shifts to benefit from the training.

As of the writing of this document, a simulated chemical leak in the Roper Rail Yard is planned for training in November 2005 while in spring 2006, Union Pacific Railroad will provide a rail car that simulates off gassing and liquid leaks. It is anticipated that the training will include repair of the valves and pumping of the tanks. The rail cars will be actual cars with simulated products.

The police department conducts annual drills and has approximately three to four incidents that require partial evacuations of neighborhoods. The feeling was expressed that the actual evacuations provide equivalent training opportunities and an ability to learn lessons. However, this incident was on a larger scale than previous incidents.

5.5.2 Evacuation Plan for Incident

An evacuation plan was developed for the incident as part of the unified incident command. Initially, the immediate area near the spill site needed to be evacuated. If the plume worsened or the wind direction changed, the evacuation plan called for the evacuation of people near the plume and to shelter-in-place the others. The evacuation plan was fluid based on incident conditions and information received by the fire department.

5.5.3 Public Shelters

Public shelters were set up at churches and government buildings by local law enforcement and the Red Cross, but most of those evacuated stayed with friends or family. Approximately eight people showed up at the shelters.

The reasons given for the low attendance at the public shelters is due to the closeness of the community. It was felt that the evacuees went to stay with family and friends.

5.6 Communication

5.6.1 Communication between Agencies

Initial Communication

Railroad workers contacted 911 and informed them of the situation. 911 in turn contacted the HazMat teams (both police and fire), and the fire department in turn activated the call-down list, which included the police department, the highway patrol, the South Salt Lake City Valley Health Department, and the Red Cross.

Main Means of Communication

The main means of communication between the entities were radios (800 MHz) and cell phones. Both police and fire in the valley utilize an 800 MHz radio system.

Fire departments within Salt Lake Valley (except South Salt Lake City) have a joint dispatch facility (Valley Emergency Communications Center), and they utilized this to communicate during the incident. The law enforcement liaison used the police department's own communication system to contact other law enforcement entities.

Law enforcement also has the ability to communicate with each other utilizing laptop computers located in patrol cars and the command center. These computers were also used to communicate with the media during the incident.

5.6.2 Communication to Evacuees and the Public

Means of Communication

The main means of communication to the general public was the use of Reverse 911®, local broadcasts on television and radio, and police officers going door to door to notify residents of the evacuation. There was an attempt made to contact open businesses with employees, but businesses open on Sunday in the incident zone were "rare."

The media was contacted through the Emergency Alert System. The media was considered helpful in providing information on road closures and the evacuation. One media firm offered the use of a media helicopter if needed.

Joint Information Center

When the evacuation order was called, a police department public information officer, provided information to the media from the incident command center, while later in the day (17:00), a Joint Information Center was established at the highway patrol dispatch center.

When the freeways were closed down, a press conference was set up on the freeway with the fire department, the police department, and the highway patrol communicating information on the fire, evacuation, and road closures respectively.

The Public Information Office for the police department was responsible for media interviews.

Web Site

The police department has a media web page that the media can log onto to find out information regarding incidents in which the police department is involved. It can be used on a daily basis by the media, since the police department will update information on the incident and post notes regarding it.

5.7 Use of ITS Equipment/Advanced Technology

During this evacuation, fixed variable message signs were activated on the interstate system and portable variable message signs were provided on both the interstate and surface streets to alert the public to the roadway closures and provide detour instructions.

The Utah Department of Transportation also used its fixed variable message signs outside of the incident zone to inform the public of the incident. Message signs approximately 50 miles to the north and 120 miles to the southeast of South Salt Lake City were activated.

Two tools suggested after this incident are:

- Additional portable message signs for a large-scale incident. The Utah Department of Transportation has to contract for these resources. The signs could be purchased and used by Utah Department of Transportation resources.
- Fixed message signs on more surface streets. There is a “tendency to underestimate variable message signs on surface streets.” However, in this instance, traffic was diverted away from the interstates to local surface streets, which could have used the additional information on traffic conditions.

5.8 Coordination

Interviewees mentioned the coordination and cooperation of all of the different entities involved. The incident allowed the entities to realize that no one entity could handle the incident on its own and help was needed. For this incident, 15 entities assisted ranging from the fire department, police department, Utah Highway Patrol, Utah Division of Emergency Services, Unified Fire Authority, Salt Lake City/County Health Department, Utah Department of Transportation, and Federal Bureau of Investigation. The incident strengthened existing relationships among the entities.

The incident tested the entities and was on a bigger scale than originally anticipated. Mitigation measures were taken quickly, and the interviewees feel they are more prepared for the next time. While the incident involved different entities and different disciplines, the entities worked as a team, and the relationships after the incident are “great.”

Salt Lake County is comprised of 16 cities and 10 fire departments. Some of the fire departments specialize in various HazMat specialties. For example, the Midvale Fire Department specializes in research and has a mobile research unit, while the Sandy City Fire Department specializes in decontamination and has a mobile decontamination unit. When incidents occur, the fire departments in Salt Lake County know the resources available to them and utilize them as appropriate. There is cooperation among the fire departments regarding resources.

The Local Emergency Planning Committee (LEPC) was involved in this incident but to a minimal degree. The LEPC was notified and was part of the incident command. The LEPC provided a mobile command post for the incident.

Other entities also provided assets and equipment. The Utah Department of Public Safety provided a mobile command post, helicopter, and public information officers. The Utah Highway Patrol provided troopers, while the Utah Department of Transportation provided barricades and signage for the road closures.

5.9 Decision Making

A unified incident command system was established. There was one representative from the affected entities such as the South Salt Lake City Fire Department, Police Department, and Highway Patrol.

The decision to evacuate was made by a group of 10 to 12 entity representatives analyzing the situation and the potential for the situation. The unified incident commander (deputy fire chief of the fire department) made the decision to evacuate in consultation with senior advisors and support staff from other entities.

The LEPC was informed but was minimally involved in this incident, since the fire department had the incident under control.

5.10 Difficulties in the Incident/Evacuation

The difficulty was in the identification of the chemicals in the leaking tanker car. In this incident, the fire department “had a time identifying the product.” The rail yard had the manifest of what they thought the car was carrying (sulfuric acid and hydrochloric acid); the side of the rail car and the Department of Transportation placard stated sulfuric acid, but it was later determined that someone loaded the cars and misidentified the products. The tanker was supposed to be loaded with two chemicals, when in fact 12 chemicals were loaded into the one car as identified by the Utah State Laboratory.

The fire department initially thought they knew what they had and started to pump out the rail car. In the process, they burned through three pumps because metal and poly fittings were being “eaten” by the chemical.

The fire department was in contact with the shipping company and kept getting conflicting reports of the product. The response was based on a worst-case scenario of nitric acid due to the orange vapor coming from the rail car.

Later into the incident, the Department of Health Laboratory identified some of the chemicals. Once the fire department knew they “had ugly stuff,” they had a better idea of how to pump it out. After the incident, the rail yard acquired updated pumps to get the “nasty stuff out” of rail cars.

There were a total of three cars loaded identically. The two other rail cars were identified in Ohio and isolated, but did not leak like the car located in South Salt Lake City.

The City of South Salt Lake requested reimbursement from Union Pacific for the incident, which is being resolved.

Tools mentioned as needed are the continued use of placards on the sides of the rail cars indicating the product in the rail car and regulations on how to properly load rail cars.

5.11 After-Action Reports

The fire department prepared a Microsoft PowerPoint presentation and is presenting it to other fire departments in the valley to allow them to experience the incident.

5.12 Best Practices

The following information highlights some of the best practices that were used during the South Salt Lake City incident.

- Joint Information Center
- Sample processing and analysis
- Training in removal of hazardous material
- Unified incident command
- The national incident management system.

5.13 Lessons Learned

There are several lessons that were learned from the South Salt Lake City incident.

Employ Additional Staff Early in the Incident

The police department felt that additional command (supervisory) staff could have been used earlier in the process. There was the belief that sufficient resources were initially available, but as the incident unfolded, it became apparent that additional staff was needed. In retrospect, additional command staff with specific assignments would have been useful.

Ensure Notification of the Evacuation to Dispatch Center

Dispatch (Valley Emergency Communications Center) should have been notified of evacuation details such as implementation, lifting of the evacuation orders, and location of evacuation centers. The dispatch center was not necessarily in the communication loop, nor was the Salt Lake Valley Health Department.

Ensure Nursing Staff at Public Shelters

There should be trained nurses at the public shelters to look for symptoms of the evacuees and provide support and answer questions. The Salt Lake Valley Health Department did not have personnel at the evacuation site for support or evaluation and, as a result, is changing its processes to achieve this.

Establish the Command Post Further Away So It Does Not Need to Be Moved

The incident command post was initially established. However, due to concerns with the winds and the plume, it was decided to move the post 1 mile further away from the incident area.

Examine a Handheld Communication Device for Communication Purposes

A compact handheld communication device was expressed as being potentially useful in the field. It could eliminate the radio and be small enough to allow for both voice and text messaging.

Improve Assess Control/Site Security and Provide Visual Identification for Command Staff

People were seen wandering around the rail yard with no identification and no determination if they were authorized staff.

Know the Resources of Private Industry in the Area

There was limited knowledge of what resources and equipment the private industry could provide. Additional resources may be located next to the incident scene if private resources are known.

Make Sure the Calldown List Has Correct Contacts

Create redundancies in the call-down list to make sure relevant entities are notified.

Make Sure Entity Representatives Can Be Found

Law enforcement had difficulty at times in finding a fire incident commander that could answer questions.

Open a Joint Information Center Earlier in an Incident

An incident gradually builds up to a point where it can become too big for one person or entity to handle. Media response can be overwhelming during an incident, so an early coordinated response would be beneficial.

Provide Additional Public Information Officers

When the evacuation process started, the public information officers were located at the scene. When the decision was made to establish a joint information center, the center was located away from the incident scene at the Highway Patrol Dispatch Center. At this facility, they had a conference room, telephones lines, computer connections, and access to the Utah Department of Transportation highway monitors.

The media was located at the scene, and public information officers fielded calls at the center. As a result, they ran out of public information officers. For this incident, at least two public information officers per entity would have been sufficient, one at the joint information center and one on the scene. The media wants to talk to firefighters on fire topics and police officers on police topics.

Provide Enough Protective Gear

Law enforcement officers did not have proper protective gear and only a few police department officers had masks.

Carry Extra Cell Phone Batteries and/or Chargers

The police department public information officer went through several cell phone batteries and had to retrieve a battery charger during the incident. Chargers are now located in some patrol cars.

Radio communication was an issue at times due to the lack of batteries for the radios.

Request Samples of Product During the Initial Reconnaissance for Quicker Laboratory Analysis and Ensure Chain of Custody of the Samples

The Salt Lake Valley Health Department, by protocol, is responsible for the packaging of the samples and delivery to the State Laboratory; but in this instance, they did not provide the sample to the State Laboratory. There was inadequate volume for multiple analyses, the sample was not properly packaged or labeled, and the sample container was inappropriate (the sample received burned through the bottle material).

Review and Incorporate the Incident into the Fire Department Training Process

Each incident can be viewed as a training opportunity and for lessons to be learned.

Utilize Traffic Engineers Earlier in the Incident

The Utah Department of Transportation felt that traffic engineers could have been utilized earlier in the incident. During the closure of the interstates, traffic operators managed the traffic flows. As the incident proceeded and there was the possibility of the interstates not opening before the Monday morning commuter, traffic engineers were brought in to develop a plan for the morning commute. Next time, bring in the traffic engineers earlier to develop the traffic plan.

5.14 What Worked and What Did Not Work

5.14.1 What Worked

Communication to the Public

During this incident, Reverse 911®, the media, and police officers going door to door were used to inform residents of the need to evacuate.

Cooperation of the Union Pacific Railroad

Union Pacific Roper Rail Yard employees assisted in the incident and provided the rail manifest to the emergency management officials. However, the initial information provided was incorrect, and the railroad staff worked to correct that information.

Development of Experience

The incident tested every entity beyond the training exercises to date. As a result, they will be better prepared for the next one.

Development of Relationships with Other Entities

Relationships have been developed over the years through training and experience; however, due to this incident, new players were involved. As a result, emergency management officials now have a person to whom they can relate.

Joint Information Center

A joint information center was established at the highway patrol dispatch center and allowed for consistent information and a unified voice in communicating on the incident. When the freeways were closed down, a press conference was set up with the fire department, the police department, and the highway patrol communicating information on the fire, evacuation, and road closures respectively.

Overall Cooperation of the Entities Involved

Entities cooperated and coordinated their efforts. The incident allowed the entities to realize that no one entity could handle the incident on its own and help was needed.

Media Web Page

The police department utilized a "FatPot" media web page that the media could log onto to find out information regarding the incident. The police department updated it as needed.

Training for a Catastrophic Event

Training exercises and drills are conducted by the various emergency management entities. To better understand rail cars and their potential for leakage, training will occur on simulated and real rail cars to allow entities to train in a safe environment regarding rail car operations.

Training of First Responders in Incident Command

First responders in South Salt Lake City are trained in incident command and have been practicing incident command for some time. As a result, incident command is established quickly when needed.

Unified Incident Command

As a result of training in incident command, a unified incident command structure is developed when applicable.

Use of the National Incident Management System

During this incident, the emergency management officials of South Salt Lake City utilized the national incident management system.

5.14.2 What Did Not Work

No Identification of All of the Chemicals Located in the Rail Car

The rail yard had the manifest of what they thought the car was carrying (sulfuric acid and hydrochloric acid). The side of the rail car and the Department of Transportation placard stated sulfuric acid, but it was not until samples were taken and analysis prepared that the chemicals were identified.

Pumping of the Rail Car Before the Identification of the Chemicals

The fire department initially thought they knew what they had and started to pump out the rail car. In the process, they burned through three pumps because metal and poly fittings were being "eaten" by the chemical.

Sample Material Did Not Match the Rail Car Manifest

First responders did not have a proper idea of chemicals involved until the laboratory results were analyzed.

5.15 Improvements for Next Time

Some improvements have been identified based on the incident.

- Canvas private industry prior to an incident for resources and equipment that can be utilized during an incident.
- Control access to the incident and establish a uniform identification badge for authorized personnel and identification vests for command staff.
- Ensure the chain of custody of a sample product.
- Preplan for the location of the command center so it does not need to be moved.
- Provide continual training with the railroad.
- Speed up the sample process for quicker identification of the product.

6 CASE STUDY #4 – Big Bear Valley, California – Old Fire, October 25, 2003

The fourth case study concerns a forest fire in Big Bear Valley, California, that started on October 25, 2003. This incident involved the evacuation of approximately 20,000 to 30,000 residents/evacuees. Appendix 1 provides a listing of organizations contacted for this case study.

The Old Fire was an extensive fire that occurred in southern California and was one of many that fire season. The focus of this case study is Big Bear Valley, which consists of the communities of Big Bear City, Big Bear Lake, and Fawnskin.

6.1 What Happened

6.1.1 Incident

In October to November of 2003, there were 13 wildfires burning in southern California, with one of the fires being the Old Fire. Old Fire burned a large portion of the San Bernardino National Forest, over 91,000 acres with an estimate of over \$37 million of damage. One of the communities impacted by the wildfire was Big Bear Valley, which is the subject of this case study.

On the morning of October 25, 2003, Old Fire occurred due to suspected arson. The environmental conditions of the forest contributed to the fire such as high fuel loads, long-term drought, and major tree mortality due to pine beetle infestation. Santa Ana winds contributed to its spread.

Residents and local officials of Big Bear Valley knew of the fire through news reports and visual sightings. The mountaintops were burning near the valley.

Initially, the fire was a federal fire due to it starting on federal land. However, once homes started burning, a unified command system was established with local, state, and federal incident commanders involved in the decision making.

6.1.2 Evacuation

Old Fire started burning for 4 days prior to the mandatory evacuation of Big Bear Valley.

Trigger points were set for the evacuation of the valley at the Old Fire Command Post. Collectively, experts in fire and law enforcement, along with local governments, determined the trigger points that were acceptable to all. These trigger points were put into the management plan of the incident.

The first trigger was set for a voluntary evacuation and the second trigger was for a mandatory evacuation. Trigger points were based on such factors as fuel type, weather, terrain, number of escape routes, and distance.

The voluntary evacuation trigger was hit early in the morning of October 25; a couple of hours later, the mandatory evacuation trigger was also hit.

When the voluntary evacuation trigger was struck, school children were en route to school. The Big Bear City Fire Department met with school officials and held off broadcasting the voluntary evacuation notice until the school children were at school for approximately 45 minutes. The reasoning was to allow for an orderly process for parents to retrieve their children. It was felt that if the voluntary evacuation order was broadcast while the school children were being transported, there could have been chaos. Once the school buses arrived at school, the schools put into place their reunification plans with parents.

The evacuation took approximately 14 hours to complete. The evacuation was compounded by the evacuation of residents and evacuees from surrounding communities. Three communities to the west of Big Bear Valley, Crestline, Running Springs, and Lake Arrowhead had residents leave their homes and evacuate to Big Bear Valley. There are approximately 20,000 full-time residents of the valley and approximately 5,000 to 10,000 residents from surrounding communities.

As a result of the fire, Highway 18 to the west of Big Bear Valley was closed. The concern with the evacuation was there are two easterly main roads that lead out of town. Highway 18, northeast of the valley, is a steep, twisty two-lane road, and traffic was slow due to the grade. The second road, Highway 38, is more scenic and not as twisty. However, if the fire had continued to push westward into the valley, Highway 38 would have been lost as an escape route. Thus, one of the evacuation triggers was maintaining escape routes.

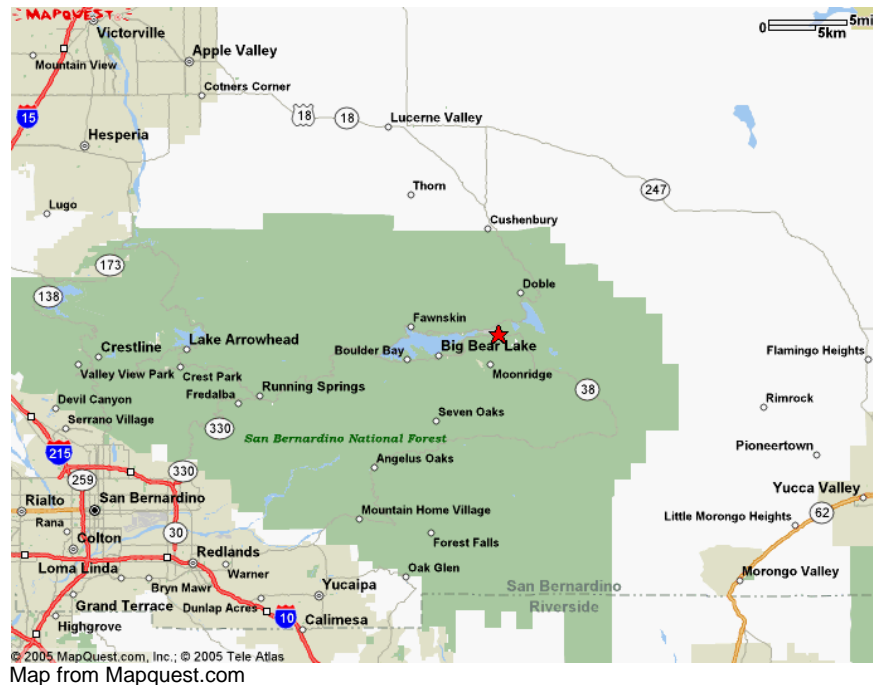
Exhibit 4 presents an approximate timeline of the incident.

Exhibit 4—Timeline for Big Bear Valley Incident

Saturday, October 25, 2003	Event
09:30	Old Fire starts
Sunday, October 26, 2003	Event
07:00	Governor declares San Bernardino County a state of emergency
Tuesday, October 29, 2003	Event
09:00	Voluntary evacuation of Big Bear Valley
10:50	Mandatory evacuation of Big Bear Valley
12:00	Schools ands residents from hospital evacuated
Tuesday, November 6, 2003	Event
	Evacuations lifted

6.2 Community

Big Bear Lake is a mountain resort community located 100 miles northeast of Los Angeles and surrounded by the San Bernardino National Forest. The altitude ranges from 6,750 to 9,000 feet with pine and oak forests located within the valley. Approximately 20,000 full-time residents live in the valley.



6.3 Focus

Questions were asked regarding the focus at the beginning of the evacuation, during the evacuation, and after the evacuation. The purpose of the questions was to determine how the focus of an incident changes as the incident evolves. Predominately, the focus at the beginning of the evacuation was getting the citizens out of the valley and out of harm's way and making sure the public was safe. There was also fear of the loss of one evacuation route.

During the evacuation, the focus varied depending on the position of the interviewee. Responses varied from:

- Additional law enforcement once people were evacuated from the valley to provide security for property – Big Bear City Fire Department
- Getting people out of the valley while at the same time bringing resources into the valley using the same two routes – Big Bear City Fire Department
- Having an orderly process for parents to be reunified with their children – Big Bear Middle School
- Making sure there were shelters for the evacuees – Big Bear City Fire Department
- Orderly procession of people out of the valley – Big Bear City Fire Department
- Providing information on traffic conditions – California Department of Transportation.

After the evacuation, the focus varied depending on the position of the interviewee. Responses varied from:

- Getting staff to evacuate themselves – Big Bear Middle School
- Fighting the fire – Big Bear City Fire Department
- Making sure the roadways were safe – California Department of Transportation.

- Providing security for the abandoned homes. Some homes were found in disarray and there was concern about break-ins until they realized the residents left quickly – Big Bear City Fire Department.

6.4 Transportation Impacts

There are three main evacuation routes out of Big Bear Valley; one to the west, which was closed, and two that are north and south of the valley. There was concern regarding the loss of the remaining roads as evacuation routes and with possible accidents that would slow the progress of evacuees. The emergency community looked into the possibility of staging resources along the evacuation route to push vehicles off the roadway if necessary.

The roadways in the valley did not allow for a quick evacuation. However, there were no incidents on the road; people were patient, and there were no recorded instances of flared tempers. People made the best of the situation.

Now, based on experience, the local emergency management community has an estimated time to evacuate the valley, in case this needs to happen again.

6.5 Advance Planning

6.5.1 Evacuation Plans

The community has a broad plan for evacuations. The main basics are in place and are left broad depending on the threat, conditions, and direction of the threat. A more detailed plan is created at the time of the incident.

In the 2 years of preplanning to get people out of the valley and bring fire departments, law enforcement personnel, and utility personnel into the valley, one aspect of the plan that was overlooked was a reentry plan.

Reentry of residents into the valley proved to be challenging. Conference calls were made with the local area command and federal officials. Recommendations were made by the local area command to allow essential services to be established before residents could move back into the community, such as open grocery stores, functional utilities (sewer, gas, and water), operational gasoline stations, and an operational community hospital.

The local emergency management officials provided recommendations, but the “powers to be” reviewed the recommendations and modified the timelines for resident reentry. Gasoline stations were quickly overwhelmed, and it was a challenge to bring in gasoline trucks to the gasoline stations. In addition, there was a lack of coordination from the law enforcement officials as to the entry of fuel trucks into the valley. In one instance, entry from the west was allowed; in the next, it was not.

Reentry of residents has been addressed since then.

6.5.2 Public Shelters

No public shelters were established in Big Bear Valley for communities evacuated to the west for the valley. People stayed primarily in local hotels and motels.

Public shelters for evacuees from the valley were set up in the high desert and the San Bernardino area. The Red Cross established shelter locations.

Public shelters were created in San Bernardino County and eventually merged into one super shelter at the San Bernardino International Airport (previously, the decommissioned Norton Airbase).

6.5.3 Tabletop Exercises—Training

Tabletop exercises and emergency operations command exercises are practiced on a regular basis within the valley. Planning is conducted for the worst-case scenario. When the fire hit, the entities involved in the incident were able to put their planning and training into effect. The evacuation went “about as smooth as it could.”

Tabletop exercises have been practiced with multiple agencies; there was no mention of actual drills/practices with multiple agencies as part of a training exercise.

6.5.4 Updates to Other Entities

When other entities entered the valley to assist in the Old Fire incident, evacuation plan updates and structure plans were distributed to the entities unfamiliar with the valley to familiarize them with the valley, local conditions, location of water, location of utilities, etc. These updates and plans provide unfamiliar entities with a way to better understand the local conditions within the valley.

6.6 Communication

6.6.1 Communication between Agencies

The main means of communication between the entities was radios, landlines, and cell phones. Some agencies also used satellite phones. Representatives were located at the Emergency Operations Center, where they received information, which in turn was passed along to their respective entities.

Communication was cited as an issue. For example, once the fire chief from the Big Bear City Fire Department was unable to access the command post, communication ceased with the command post and communication isolation set in. To resolve this, part of the preparation for the Emergency Operations Center was the ability to take care of itself until help got through. However, frustration was voiced, as the valley was on its own for 2 days until a Federal National Team (a Type 1 National Incident Management Team coordinated by the National Wildfire Coordinating Group, with team members from various agencies) was assigned to it.

6.6.2 Communication to Evacuees and the Public

Main Means of Communication

The main means of communication to the public was through the media, radio, and television. Radio played a key factor due to its ability to provide information quickly to the

community. Police officers also went from street to street broadcasting the need for an evacuation, and word of mouth informed people of the need to evacuate. Evacuation maps were provided to evacuees to assist them in getting off the mountain.

Since that time, the city has acquired Reverse 911® and, with the use of grant funds, has installed four sirens throughout the valley. Once the siren is turned on, citizens are instructed to turn to the local radio station for additional information.

California Department of Transportation (Caltrans)

Caltrans has a district transportation management center located in San Bernardino that was used to manage traffic during the southern California wildfires. Big Bear Valley does not have ITS equipment installed such as changeable message signs, video feed, detection loops, or highway advisory radio. Caltrans had to rely upon staff to inform them of what was going on. Communication to Big Bear Valley residents was through traditional means.

Caltrans attended San Bernardino County Emergency Operations Center meetings and provided regular briefings on updated traffic conditions, with commuter alerts to media organizations through fax or email. Caltrans also provided updated information to traffic news services, elected officials, and traffic bureaus and also posted the information to its own Web site. People could also call into Caltrans to find out about driving conditions and alternate routes. After hours, the Caltrans Web site was updated remotely to keep people informed of the situation.

After the evacuation order was rescinded and people were allowed to return to their homes, some of the critical infrastructure was not back on line such as gas stations or grocery stores, and some of the roadway infrastructure such as guard rails was destroyed. The California Highway Patrol provided an escort to safely transport people up and down the mountain. Caltrans broadcast the times and routes available for residents.

Joint Information Center

A joint multi-entity information center was developed for Old Fire. A centralized information center allowed the entities to deliver a unified message to the community and the media, which is important during a time of crisis.

Safe Community Alert Network (SCAN)

A communication service identified as a result of the interview process is SCAN. This is a new, free service to public agencies and consumers that allows for text messaging or web messaging of public service announcements. Consumers can specify the type of message they want to receive. The message can be sent to personal digital assistants cell phones, pagers, computers, etc. In addition, an entity can use the service to notify special staff, such as Emergency Operations Center staff, with the use of a password. SBC has made a commitment as part of its public safety concerns to provide the service. As of the writing of this document, SCAN is currently provided in the states of California, Nevada, and Texas, and it is anticipated to provide nationwide coverage in 2005.

6.7 Use of ITS Equipment/Advanced Technology

Portable message signs were used to provide information to the evacuees. These signs were available through the Sheriff's Department and Caltrans.

Caltrans received complaints about the accuracy and relevance of communications regarding roadway conditions. People wanted to know immediately which roads were opened or closed and wanted the information available while in their car. Information received through a cell phone, personal digital assistant, or radio, and not necessarily the Internet, could have helped provide a better communication link to residents and travelers.

Non-advanced technology was also used to establish road closures. Caltrans had pre-positioned traffic barriers and road-closed signs at various locations and chained them to various posts and anchors in the ground to ensure they remained there. If a roadway was to be closed, the equipment and barriers were already in place, and they unchained the equipment and set up the roadblock.

6.8 Coordination

6.8.1 Unified Incident Command

Initially, federal crews responded to the fire. Once homes started to burn, a unified incident command system was used for Old Fire, and Big Bear Valley was part of the incident command.

6.8.2 San Bernardino County Mountain Area Safety Taskforce (MAST)

Eighteen months prior to the incident, MAST was created to deal with a catastrophic fire and evacuation. "MAST is a county organization made up of local, state, and federal government agencies, private companies, and volunteer organizations. One of the responsibilities of the MAST is assuring public safety through development of evacuation plans, vegetation management through hazard tree and fuel removal, preplanning, and public information. The MAST program was identified as a direct contributor to the success in the mountain communities. The San Bernardino County Fire Chief's Association agrees that the MAST effort, including training and planning, saved a large number of lives and homes, as well as reduced the time required to establish an effective multi-agency, unified command," as reported in the San Bernardino County Fire Chief's Association *Lessons Learned Report – Fire Storm 2003 – "Old Fire."*

MAST helped establish better lines of communication and allowed entities to interact in a new way. In the case of Old Fire, a Federal National Team took over command of the fire. In the past, "feathers were ruffled" with this type of transition, from local to federal. However, MAST helped establish relationships between local, state, and federal officials for the transition process. With MAST, relationships are established regionally, and it is known that once a transition takes place, there is to be a respect of local conditions.

The consensus was there was good cooperation between all parties and everyone knew their roles and responsibilities. Overall, everyone tried to cooperate and communicate.

6.8.3 Transit Agencies

Two public transit agencies cooperated and coordinated services to evacuate people without transportation from the valley, down the mountain, and into public shelters.

Mountain Area Regional Transit Authority (MARTA)

MARTA participates in the mountain mutual-aid agreement and was informed when the need to evacuate residents was established. MARTA had a seat at the unified command center and received information at the same time as the other participants. MARTA was represented 24/7 and used its radio system to contact its base and operators.

MARTA vehicles and manpower were staged at the command post to allow for the evacuation of residents off the mountain. Initially, six vehicles were used, but through creation of 12-hour shifts, three vehicles were used to evacuate approximately 1,200 residents.

MARTA provided evacuation services for 2 weeks with the use of cutaway vehicles. MARTA normally uses 30-foot buses, but due to the nature of the roadways (winding and narrow), decided to use the cutaways with a shorter wheelbase. The vehicles could hold approximately 11 to 18 passengers.

Some residents decided to remain after the mandatory evacuation order was given, and therefore MARTA was transporting people after the mandatory evacuation order.

Focus

During the start of the evacuation, the focus was on getting bus operators to work. Approximately half of the bus operators did not report to work.

During the evacuation, the focus changed to reentry of the vehicles back into the evacuation area. MARTA sent buses down the mountain with evacuees. When they returned to the evacuation area, local law enforcement had a “hard lock on the mountain” and would not allow the buses to enter the evacuation zone. There were discussions to allow the vehicles to return. Since that time, a placard system is in effect that is signed by local law enforcement to allow for the return of MARTA vehicles back into an evacuation area.

Also during the evacuation, MARTA re-thought its transportation of pets. People did not want to evacuate without their pets, and therefore MARTA relaxed its requirements to have pets in carriers and allowed pets to ride with the evacuees.

After the evacuation, the focus of MARTA was on the reentry of residents back into the valley. When people were evacuated off the mountain, MARTA did not necessarily know where the evacuees were. Some of the evacuation shelters had to be moved due to the fire situation. Up to 2 weeks after the incident, MARTA was receiving calls from evacuees to pick them up and return them home.

One issue with the return of evacuees is the transportation of luggage and “freebies.” When people are evacuated to public shelters, evacuees tend to receive “freebies” to help them compensate for their experience. MARTA found out that for every bus of people, there needed to have a bus for luggage and “freebies.” Five cutaways were used for the transportation of luggage.

Lessons Learned

There are several lessons that were learned from the Old Fire incident:

- Communicate with family members and have preplanning for family members of all staff to inform them of their loved ones' activities and possible need to be away for some time.
- Keep accurate records for reimbursement purposes.
- Plan for the transportation of "stuff."
- Provide a backup generator for the phone system and communication system for when the electricity shuts down.
- Provide alternative communication systems such as satellite phones when cell and landlines are disrupted.
- Provide supplies (food and water) and a place to take a nap for the first 12 to 24 hours. At that time, "you are on your own," until the mobile canteens/kitchens are set up. Have enough supplies on hand to take care of the staff.

Why a Success

MARTA participates in the mountain mutual-aid agreement and was part of the coordinated effort when the need to evacuate residents was determined. Public transit participated in the 2 years of preplanning for an evacuation of the valley, and MARTA understood its role and responsibilities.

Omnitrans

Omnitrans of San Bernardino assisted in the evacuation by meeting MARTA buses at the bottom of the mountain at evacuation centers and transporting the people on to public shelters established in San Bernardino County. Eventually, the public shelters were merged into one super-shelter at the San Bernardino International Airport. Omnitrans provided transportation to that location.

Omnitrans used standard 40-foot buses that could move a larger volume of people. Approximately 200 people were evacuated, along with some pets with the MARTA/Omnitrans transportation. Most people leaving the valley did so with their own transportation.

MARTA and Omnitrans had never practiced this scenario before nor contemplated the need for this service; the idea for it grew spontaneously. The Omnitrans staff have working relationships with the MARTA staff, and out of the initial contact, a plan was made to assist MARTA. Omnitrans had some service near the affected area and therefore had buses that could not be used for normal transit service; instead, the idea was to turn the buses into evacuation service units.

It took Omnitrans approximately 24 hours to assist in the evacuation of valley evacuees.

Lessons Learned

There are several lessons that were learned from the Old Fire incident:

- Key staff at Omnitrans are trained in emergency management. Omnitrans is in the process of conducting training for mid-managers and first-line supervisors in emergency management. Key staff may not always be available in times of crisis; in the Old Fire incident, almost all key staff was not available. By training mid-managers

and first-line supervisory staff, Omnitrans has increased its staff knowledge in emergency management and its ability to respond to a crisis.

- Provide provisions for 24-hour dispatch.
- Set up accounting procedures to allow for possible reimbursement of expenses.
- Set up a mechanism to count the number of evacuees transported.
- Take photos of the event.

Why a Success

Omnitrans has working relationships with emergency management officials in the San Bernardino and southern California area. Staff have also been trained in emergency management and are extending this training to middle management and first-line supervisors. During the Big Bear Valley evacuation, planning and staff intelligence contributed to the success of the evacuation.

6.9 Decision Making

A unified incident command system was established. There was one representative from the affected entities and/or communities.

The decision to evacuate was made collectively by representatives analyzing the situation and its potential. The unified incident commander made the decision to evacuate in consultation with senior advisors and support staff from other entities.

6.10 Difficulties in the Incident/Evacuation

Communication proved to be the biggest difficulty during the incident. Because of fires in the 1970s, the State of California set up a common communication system to allow emergency management entities to communicate with each other. Now in the state, fire departments have multiple radio systems such as UHF, VHF, 800 MHz, and digital systems that are unable to communicate with each other. In addition, the push-to-talk services do not always allow for communication between entities. Workarounds were used in this incident such as the use of cell phones and face-to-face meetings.

Once the Big Bear Valley incident commander was unable to proceed to the incident command center, communication between the valley and the command center stopped. Emergency management officials were on their own for 2 days before assistance arrived.

6.11 After-Action Reports

Two after-action reports were initially identified in the literature search. These after-action reports and their location on the World Wide Web are as follows:

San Bernardino County Fire Chiefs' Association, *Lessons Learned Report – Fire Storm 2003 – “Old Fire,”* William Maxfield, Fire Chief Retired, 9-1-1 Consulting Group, Inc., <http://www.myfirecommunity.net/documents/Old Fire Lessons Learned Report 2003.pdf>.

6.12 Special Needs

During the Old Fire incident, the Bear Valley Community Hospital was evacuated along with schools.

6.12.1 Bear Valley Community Hospital Resident Evacuation

Bear Valley Community Hospital long-term residents were evacuated. This was the first time the entire community hospital had ever been evacuated.

The evacuation of the elderly care residents from the hospital was coordinated with Big Bear City Fire Department and the City of Big Bear Lake Emergency Management Services through the Emergency Operations Center.

A week before the evacuation of the hospital, the fire chief contacted the hospital and conducted pre-disaster planning such as, if the need for an evacuation was clear, what type of transportation was needed and from where would the transportation come.

Once the decision was made to evacuate the community, the hospital instituted an internal disaster plan. When the hospital was informed of a voluntary evacuation, the director of nursing provided guidance to staff and delegated responsibilities to perform certain tasks. Some staff were directed to prepare the residents for an evacuation, pack up residents' medical records, pack up 3 days of food, pick up the medications, call in additional clinical staff, and contact families. By delegating tasks, the staff were focused on the evacuation of patients and not necessarily on the fire situation.

By the time the ambulances arrived at the hospital, residents and staff were ready to leave. To facilitate information regarding a resident, the resident's individual medical file went along with the patient, in addition to the medication.

A task force from American Medical Response (AMR) provided five ambulances to transport the 20 long-term residents located at the hospital. Two of the acute care residents were evacuated by air due to the lengthy ambulance trip. Normally, it takes 1 ½ hours to get off the mountaintop, but this trip took 3 hours.

The total time to evacuate the hospital was approximately 3 ½ hours.

During the voluntary evacuation period, the incident command center found beds for the residents, but the beds were scattered among several nursing homes. There was a concern with the separation of the residents, and it revolved around three main areas:

- (a) The residents would find it difficult to adjust to new surroundings, and familiar staff is needed to maintain continuity. With the residents being divided among multiple nursing homes, there was not enough staff to maintain contact and continuity among the residents.

- (b) Family members would need to be directed to multiple nursing homes, and it was felt that one nursing home location would be beneficial to family members.
- (c) Additional residents would tax the existing staff at the nursing homes. To alleviate this issue, Bear Valley hospital staff would be needed at the multiple nursing homes. There was not enough staff for this to occur.

The director of nursing contacted several nursing homes; in the meantime, Braswell's Colonial Care in Redlands, California, contacted the director and offered the number of beds required. At the time of the Big Bear Valley evacuation, the hospital did not have agreements with other nursing homes to take in residents. Since that time, this has been corrected.

To assist Braswell staff, seven hospital staff were sent to look after the residents. They remained at Braswell's for 5 days until they could be returned to Big Bear Valley. For the return to Big Bear Valley, AMR was contacted for the return trip. Residents were returned a day after the evacuation order was lifted.

Communication

Communication with the staff in Redlands proved to be difficult due to downed telecommunication lines. Cell phones provided coverage, and as a result, staff now have cell phones.

Drills and Training

The hospital participates in annual disaster training drills, an annual statewide disaster drill, and valley tabletop exercises, but not on the scale of the evacuation. However, training did help familiarize staff with the need for an evacuation.

Focus

The focus at the beginning of the evacuation was to find one facility that could accommodate all of the residents. During the evacuation, the focus was on getting residents ready for the evacuation, dealing with anxious staff whose homes were under an evacuation order, and dealing with family members who were contacting the hospital for information and the evacuation location.

After the evacuation, the focus was on making sure the residents received the care they were accustomed to and keeping the residents calm due to unfamiliar surroundings and people.

Hospital Closure

The hospital continued to function for 3 days after the evacuation of its long-term residents. The hospital emergency room remained open to provide medical facilities for people in need of care. After 3 days, the smoke from the fires proved to be overwhelming, and the hospital was closed.

Lessons Learned

There are several lessons that were learned from the Old Fire incident:

- Create a disaster book with emergency contact information and local nursing homes phone numbers.

- Ensure staff have cell phones for communication purposes.
- Have a written evacuation plan that is shared with the staff.
- Maintain a current list of emergency contacts for residents, patients, and staff. Staff information should include home number, cell phone number, and emergency contact numbers.
- Ensure there is a place to send residents/patients during an emergency. There are now verbal agreements with other facilities for the evacuation of patients/residents.
- Pack supplies for longer than 3 days. Residents were away from the hospital for 5 days.

Why a Success

The evacuation of the hospital was coordinated with the Bear City Fire Department and the City of Big Bear Lake Emergency Management Services through the Emergency Operations Center. A week before the evacuation occurred, the fire chief contacted the hospital and conducted pre-disaster planning such as, if the need for an evacuation was clear, what type of transportation was needed and from where would the transportation come.

The hospital also participates in tabletop exercises and understands its roles and responsibilities. Preplanning for the evacuation assisted in the successful evacuation of the hospital.

6.12.2 Big Bear Valley Schools

Schools in Big Bear Valley were evacuated. The day before the evacuation of the valley, the superintendent of the schools was informed of the potential for an evacuation and passed this information along to staff of the school district. Students of the schools were sent home. District staff were told that the local emergency management officials would not try to evacuate when school was in session. However, the next day after students were at school, the winds picked up and a mandatory evacuation of the valley occurred.

High School

One of the high schools served as a collection point for surrounding schools for students without transportation. Students were bused to that location and placed in the gymnasium until parents could be reunited with their children. Parents either were known to school administrators or were required to show identification.

This decision was made on “the fly” and not incorporated into any of the school training. School training normally consists of annual fire drills; however, the decision to use one school as a collection area was dictated by geography and the fire. The school selected was the furthest away from the fire.

Approximately 75 percent of high school students have their own transportation and left on their own accord. Approximately 900 high school students were evacuated, and it took 5 hours for parents to be reunited with their high school children.

Middle School

Within the first hour of school, a voluntary evacuation order was given to the community. At that time, the middle school decided to evacuate and reunify parents with their 600 children. Phone calls were made for over 3 hours to parents to tell them of the need to pick up their children.

The school determined that an orderly process was needed for reuniting students with their parents. School children were informed to return to their home room class to await their parents and a sign-out sheet was created to check out the students.

As parents arrived at the school, they were directed to an office, where they could pick up their children. Staff were directed to the front of the building to keep parents calm during the incident.

All of the students were picked up within 3 ½ hours of the start of the evacuation. As the number of students decreased, staff with small children were released to go pick them up for evacuation of the valley.

Lessons Learned

- There are several lessons that were learned from the Old Fire incident:
- If family is not available, friends can be contacted to pick up a student. Some of the family members work off the mountain and had difficulty in returning to the valley.
- Almost every student had a cell phone. The school policy is not to allow students to use cell phones while in school. During this incident, when the students were in the gymnasium, they called their parents to inform them of the school closing. After this incident, the high school has thought of relaxing this school policy.
- Use a workaround for a communication issue. The landlines were lost, there was no radio repeater, and the handheld radios worked for approximately a mile. Communication back to the district office was problematic, so a workaround was to position school buses at a jump point where a bus could be contacted, which in turn contacted another bus and so forth until the district office was contacted.

Why a Success

The evacuation of schools in Big Bear Valley was a success due to several factors:

- An orderly process was developed to allow parents to pick up their children in a calm setting.
- There was school training for emergency drills.
- The Big Bear Valley incident commander decided to hold off announcement of an evacuation until the school children arrived at school, thus allowing for an orderly evacuation of students.

6.13 Best Practices

The following information highlights some of the best practices that were used during the Big Bear Valley incident:

- Ability to change procedures on the fly (e.g., pets on MARTA vehicles)
- Communication workarounds
- Controlling a potential chaotic scene at the local schools with evacuation procedures
- Tabletop exercises
- Unified incident command
- Joint information center.

6.14 Lessons Learned

There are several lessons that were learned from the Big Bear Valley incident.

Adopt a Reentry Plan

Two years were spent on planning for the evacuation of residents out of the valley and the entry of fire, law enforcement, and utility personnel. However, the evacuation plan did not accommodate the need for the reentry of residents. Reentry of residents proved challenging, and subsequently, the reentry of residents has been addressed. Since the time of the Old Fire, a reentry plan has been established to allow for the reentry or re-opening of critical infrastructure facilities such as sewer, water, gasoline stations, grocery stores, and the hospital before residents will be allowed to return.

Have Secure Lines of Communication

When the fire chief of Big Bear City was unable to return to the command center, communication with the incident command center stopped. Communication needs to be re-established and secure. Through grants, the Big Bear City Fire Department has purchased four satellite phones since land and cell lines were overwhelmed.

Identify Relocation Facilities Ahead of Time

Have pre-identified potential relocation facilities (such as nursing homes) in case the valley hospital needs to be evacuated again, as well as written agreements with these facilities.

Issue Identification Passes

Emergency personnel entered into the valley to assist the local emergency management officials during the incident. The local community is examining a pass to allow personnel into the valley. A form or a card may be issued by the Sheriff's Department after receipt of an application. The pass would be uniform to allow for quick identification.

Use a Vehicle Placard to Allow for Vehicle Reentry

Vehicle placards have been developed to allow transit vehicles to reenter an evacuation or incident zone to transport evacuees. Local law enforcement signs the placard that is to be displayed in the front window for viewing.

6.15 What Worked and What Did Not Work

6.15.1 What Worked

Delegation of Responsibilities

During the evacuation of the hospital, tasks were delegated and assigned to various staff members. By focusing on the tasks at hand, staff concentrated on evacuation of the residents and not the fire situation.

Joint Information Center

A joint information center allowed for consistent information to the general public and evacuees regarding the incident and ability to return home.

Mountain Area Safety Taskforce

Eighteen months prior to the incident, MAST was created to deal with a catastrophic fire and evacuation. MAST helped establish better lines of communication and allowed entities to interact in a way not done before. MAST is cited as a direct contributor to the success of the Old Fire incident response.

Pre-Established Road Block Equipment

Caltrans had pre-positioned traffic barriers and road-closed signs at various locations and chained them to various posts and anchors in the ground to ensure they remained there. If a roadway was to be closed, the equipment and barriers were already in place, and they unchained the equipment and set up the roadblock.

Pre-Established Relationships Among Entities

Entities in the Big Bear Valley incident had trained and exercised together. As part of MAST, entities were introduced to other entities with which they normally may not have dealings. Having pre-established relations among entities prior to an incident helped during this incident.

Training Exercises – Inclusion of Hospital in Tabletop Exercises

Training exercises, including tabletop exercises, have been conducted in Big Bear Valley, and the local community hospital is a participant. Knowing what to do and who you can work with helped in the Big Bear incident.

Unified Incident Command

Unified incident command has been practiced in California for years and was born out of wildfires in the state. Unified incident command allows for a unified response to an incident and allowed multiple entities to act as one during the Big Bear Valley incident.

6.15.2 What Did Not Work

No Utilization of Existing ITS Technology

Caltrans had to rely upon staff for information, rather than viewing the information from its district traffic management center. The valley is not wired, and as a result, no ITS technology was utilized.

Stopped Communication

Communication stopped between Big Bear Valley and the incident command center when access to the unified incident command center was unavailable.

No Reentry Plan

Time was spent on evacuation planning out of Big Bear Valley, but the planning did not include a reentry plan. As a result, reentry into the valley was at times chaotic. This has since been corrected.

6.16 Improvements for Next Time

Some improvements have been identified based on the incident.

- Evacuate residents off the mountain and not up the mountain. Communities to the west of Big Bear Valley evacuated to the valley, which in turn was itself evacuated. Some people evacuated twice.

- Have full-scale training exercise with multiple entities, including the hospital and transit agencies.
- Have written agreements with nursing homes and/or hospitals for the settlement of patients/residents.
- Provide traffic information that can be accessed by driver handheld devices.
- “Wire” the valley for ITS technology.

7 Summary of the Findings

7.1 Observations

The four incidents selected are incidents that can happen almost any day, anywhere in the United States. These incidents are on a smaller scale than incidents such as 9/11 or the blackouts of the east coast in 2003, but they have a higher probability of occurring any time, any place. In fact, during the conducting of interviews for this project on the Old Fire incident, three major forest fires were burning in southern California and one was burning in the San Bernardino National Forest area.

7.2 Common Successes

Common themes throughout the case studies are the use of the incident command system and training for possible incidents.

7.2.1 Incident Command

The first common theme throughout the case studies was the use of an incident command system. In all of the case studies, an incident command was quickly established after the incident, with entities understanding their roles and responsibilities. Not all establishments of an incident command went smoothly, but once established and functioning, the use of an incident command allowed for a unified response to the incident.

7.2.2 Training

The case studies have highlighted the impact of inter-entity training on the management of incidents. Due to training, entities effectively responded to all of the incidents and coordinated their responses. Entities that train together are able to establish a unified command quickly and have a more effective response.

Training ranges from tabletop exercises to full-scale incidents such as a weapons-of-mass-destruction scenario. Inter-entity training provides pre-incident planning with the ability to revise procedures before having to actually exercise them. It allows entities to establish relationships and build on existing ones.

Although the nursing homes and the hospital in this report have not received the type of training applicable to fire or law enforcement departments, the reason their evacuations succeeded was due to their internal training and drills.

Training allows an entity to test its resources in a safe environment and learn from its mistakes safely. Training contributed to the success of the case studies presented in the report.

7.3 Focus

7.3.1 Beginning of the Evacuation

Predominately, the focus at the beginning of each evacuation was getting the citizens out of harm's way and making sure the public was safe.

During the Big Bear Valley incident, other focuses arose:

- MARTA's focus was on getting operators to work to drive the transit buses for the evacuation of the valley.
- The emergency management focus also included ensuring the evacuation routes remained open and safe.

7.3.2 During the Evacuation

During the evacuation, the focus varied depending on the position of the interviewee. The responses have been categorized into five areas of communication—evacuees, process, resources, security, and transportation.

Evacuees

- Keeping people out of the evacuation zone, dealing with citizens who had left behind pets and medication, and dealing with people concerned with their homes – El Dorado Police Department.
- Making sure there were shelters for the evacuees – Big Bear City Fire Department.
- Dealing with people who passed out and could not evacuate – GVW Fire Department.

Process

- Keeping the drinking wells safe with the contamination on the ground. Residents may have contaminated water when they return – South Salt Lake City Fire Department.
- Maintaining an orderly procession of people out of the valley – Big Bear City Fire Department.

Resources

- Having additional law enforcement once people were evacuated from the valley to provide security for property – Big Bear City Fire Department.
- Getting people out of the valley while at the same time bringing resources into the valley using the same two routes – Big Bear City Fire Department.

Security

- Keeping sightseers out of the evacuation zone – Union County Emergency Management.
- Keeping unauthorized people and “rubberneckers” out of the evacuated areas – South Salt Lake City Police Department.
- Providing security for the evacuated area – South Salt Lake City Police Department.

Transportation

- Dealing with elderly residents who did not have a way out of the evacuation zone – GVW Fire Department.

- Ensuring the interstate ramps were closed, ensuring the right ramps were closed, and determining where to put the displaced traffic – Utah Department of Transportation.
- Evaluating the transportation of pets – MARTA.
- Providing information on traffic conditions – California Department of Transportation.
- Handling the reentry of vehicles back into the evacuation area – MARTA.

7.3.3 After the Evacuation

After the evacuation, again responses varied depending on the entity. The responses have been categorized by communication, evacuees, process, security, and transportation.

Communication

- Notifying people of when they could return home. They had no idea where people went, so the media was used to alert residents when they could return home – South Salt Lake City Police Department.

Evacuees

- Allowing people back into their homes – El Dorado Police Department.
- Handling the reentry of residents back into the valley – MARTA.

Process

- Dealing with the after effects of the fire, smoke and chemicals in the air – Union County Emergency Management.
- Providing animal rescue from the evacuation zone – GVW Fire Department.
- Fighting the fire – Big Bear City Fire Department.
- Making sure homes were safe to return to, conducting ground testing of the air near evacuated residential homes, and if possible conducting swab tests inside homes for chemical residue – Union County Emergency Management
- Making sure everyone was accounted for – GVW Fire Department.

Security

- Providing security for the abandoned homes. Some homes were found in disarray, and there was concern about break-ins until they realized the residents left quickly – Big Bear City Fire Department.

Transportation

- Educating the public about the closures and how to maneuver around the area – Utah Department of Transportation.
- Determining how quickly traffic management could be restored – Utah Department of Transportation.
- Making sure the roadways were safe – California Department of Transportation.
- Providing traffic control for the return of residents – South Salt Lake City Police Department.

Generally, the immediate focus at the start of the evacuation is to move residents out of the evacuation zone. After that, the focus depends on the entity and its role in the incident.

7.4 Transportation Impacts

Impacts to the transportation system depend on the incident. Two of the incidents resulted in little to no impact on the local transportation systems, while two others did have an impact.

7.4.1 El Dorado, Arkansas

There appeared to be no impact to the transportation system due to the El Dorado incident. The police department cordoned off the evacuation zone, and traffic was rerouted through town. The main north-south roadway, US 167, was closed, but traffic was rerouted around the downtown. This incident happened on a Sunday morning, but if it had occurred during the week, there would have been little impact on the traffic system.

However, since the residents of the nursing homes and prisoners at the county jail facility are without personal vehicles, ambulances and school buses were used to evacuate the nursing home residents and school buses were used to evacuate the prisoners.

Predominately, the method of transportation for the nursing home residents was the use of buses; however, approximately 15 to 33 residents required the use of ambulances for their evacuation. Six ambulances were utilized to evacuate these residents. Four ambulances were from the city and two were from the county.

7.4.2 Graniteville, South Carolina

There appeared to be little impact to the transportation system due to the Graniteville incident. The Aiken County Sheriff's Office cordoned off the evacuation zone and traffic was rerouted through the community. The main thoroughfare (Aiken/Augusta highway), a four-lane roadway connecting Aiken, South Carolina, to Augusta, Georgia, was closed for over a week, but traffic was rerouted through the area onto parallel roads or Interstate 20.

In addition, roadblocks were established around the incident zone, and a curfew (dusk to dawn) was set to stop unauthorized people from entering the zone.

"Access [was] controlled early through traffic control points established quickly and efficiently due to recent training. Locations [were] determined based on major intersections and information received from 911 distress calls within first 15 minutes. Roadblock placement [was] reevaluated within first 30 minutes, and determined to be adequate based on wind direction and HazMat input," as reported in the *Aiken County Sheriff's Office After-Action Report*.

The train manifest from Norfolk Southern was available to fire and police either in 30 minutes or up to 2 hours from the time of the incident. Interviewees expressed cooperation from the railroad in identifying the chemicals.

7.4.3 South Salt Lake City, Utah

The Roper Rail Yard, scene of the hazardous material spill, is located near the intersection of Interstates 15 and 80, which were closed. In addition, due to the incident, local streets were also closed.

The police department, department of public safety, and highway patrol were involved in the closing of the roadways. Roadways were quickly blocked with barricades and barrels.

As the neighborhoods were evacuating, the local streets were barricaded with roadblocks to prevent the reentry of residents and the entry of unauthorized personnel.

At approximately 12:45 on Sunday, March 6, 2005, Interstates 15 and 80 were shut down, which took a little more than 1 ½ hours. Initially, Utah Department of Transportation resources were used to close the interstates. Once it was determined that the closure would take longer than anticipated, it was decided to use an authorized traffic management contractor to close down the interstates with barriers and electronic signs.

State troopers were sent to patrol and monitor the closed freeways to ensure motorists did not drive onto the roadways.

The main means of communication to the traveling public was using fixed and portable dynamic message signs, 511 travel services, highway advisory radio, and the commuter link Web site. It was felt that the notification worked well.

There was an initial backup of approximately 1 to 2 miles when the interstates were initially closed, but this was quickly dissipated. While not associated with this incident, the Utah Department of Transportation conducted a public opinion poll and found that 70 percent of people polled would change their travel pattern if information was provided. After the initial closure, traffic was manageable.

7.4.4 Big Bear Valley, California

There are three main evacuation routes out of Big Bear Valley; one to the west, which was closed, and two that are north and south of the valley. There was concern regarding the loss of the remaining roads as evacuation routes and possible accidents that would slow the progress of evacuees. The emergency community looked into the possibility of staging resources along the evacuation route to push vehicles off the roadway if necessary.

The roadways in the valley did not allow for a quick evacuation. However, there were no incidents on the road; people were patient, and there were no recorded instances of flared tempers. People made the best of the situation.

Now, based on experience, the local emergency management community has an estimated time to evacuate the valley, in case this needs to happen again.

7.5 Advance Planning and Preparation

Each of the incidents involved advance planning and preparation. The following is a summary of this information.

7.5.1 Drills – Tabletop Exercises

Drills and/or tabletop exercises also appear to be prevalent among the entities of the incidents reviewed. Many entities also engage in multi-entity training exercises or tabletop exercises. One exercise in South Salt Lake City, Utah, mimicked the incident a year before it happened.

7.5.2 Emergency Preparedness Plan

In all of the incidents, an emergency preparedness plan was in place. Most of the plans appear to be an all-hazards plan that can be used for such incidents as tornadoes, chemical spills, and severe weather.

7.5.3 Evacuation Plan for the Incident

In at least one incident, an evacuation plan for the incident was prepared as part of unified incident command. The evacuation plan was fluid based on incident conditions and information received by the fire department.

In the Big Bear Valley incident, 2 years of preplanning occurred to get people out of the valley and bring fire departments, law enforcement personnel, and utility personnel into the valley; however, one aspect of the plan that was overlooked was a reentry plan. Reentry of residents into the valley proved to be challenging and has been addressed since then.

7.5.4 Local Emergency Planning Committee

Each community has a local emergency planning committee for the planning and management of incidents; in Big Bear Valley, it is known as MAST. Some communities have a local emergency planning committee that is very engaged with frequent emergency planning meetings and drills and exercises, while others appear to be less active.

7.5.5 Public Shelters

Public shelters were used during all of the incidents, but their use depended on the length of the evacuation and whether family and friends were close by with the ability to accommodate the evacuees.

The Red Cross handles the shelters and appears to be on the call-down lists maintained by either the incident commander or the emergency management coordinator.

7.5.6 Updates to Other Entities

In one of the incidents, as emergency personnel from outside the area arrived to assist, the evacuation plan updates and structure plans were distributed to allow for familiarization with the location, local conditions, location of water, location of utilities, etc. It provided unfamiliar entities with a way to better understand local conditions.

7.6 Communication between Entities and to Evacuees and the General Public

Each of the incidents involved communication between the entities and to the evacuees and the general public. The following is a summary of this information.

7.6.1 Entities

The main means of communication between entities is the use of radios, landlines, and cell phones. The initial information was generally received by either the fire department, police department, or 911. They, in turn, called others to inform them of the incident. Some entities also used satellite phones for communication purposes.

7.6.2 Evacuees and the General Public

For all of the evacuations, the main means of communicating to evacuees and the general public was through the local media, both radio and television. Some communities used *Reverse 911®*, if available.

Other methods included the police going door to door, the police driving through neighborhoods and using their public announcement system to broadcast the evacuation notice, and police media Web pages.

Media briefings occurred for all of the incidents with the use of a joint information center that allowed various entities to provide a unified voice for the incident.

One department of transportation provided regular briefings on updated traffic conditions, with commuter alerts to media organizations through fax or email. It also provided updated information to traffic news services, elected officials, and traffic bureaus and also posted the information on its own Web site. People could also call to find out about driving conditions and alternate routes. After hours, the department Web site was updated remotely to keep people informed of the situation.

7.7 Use of ITS Equipment/Advanced Technology

Two of the incidents did not require advanced technology, nor was a need expressed for such technology. The other two incidents did use ITS technology to a degree.

7.7.1 South Salt Lake City, Utah

During this evacuation, fixed variable message signs were activated on the interstate system and portable variable message signs were provided on both the interstate and surface streets to alert the public to the roadway closures and provide detour instructions.

The Utah Department of Transportation also used its fixed variable message signs outside of the incident zone to inform the public of the incident. Message signs approximately 50 miles to the north and 120 miles to the southeast of South Salt Lake City were activated.

Two tools recommended after this incident are:

- Additional portable message signs for a large-scale incident. The Utah Department of Transportation has to contract for these resources. The signs could be purchased and used by Utah Department of Transportation resources.
- Fixed message signs on more surface streets. There is a “tendency to underestimate variable message signs on surface streets.” However, in this instance, traffic diverted away from the interstates were diverted to local surface streets, which could have used the additional information on traffic conditions.

7.7.2 Big Bear Valley, California

Caltrans has a district transportation management center located in San Bernardino that was used to manage traffic during the southern California wildfires. Big Bear Valley does not have ITS equipment installed such as changeable message signs, video feed, detection loops, or highway advisory radio. Caltrans had to rely upon staff for information about what was going on. Communication to Big Bear Valley residents was through traditional means.

Portable message signs were used to provide information to the evacuees. These signs were available through the Sheriff's Department and Caltrans.

Caltrans received complaints about the accuracy and relevance of communications regarding roadway conditions. People wanted to know immediately which roads were opened or closed and wanted the information available while in their car. Information received through a cell phone, personal digital assistant, or radio, and not necessarily the Internet, could have helped provide a better communication link to residents and travelers.

Non-advanced technology was also used to establish road closures. Caltrans had pre-positioned traffic barriers and road-closed signs at various locations and chained them to various posts and anchors in the ground to ensure they remained there. If a roadway was to be closed, the equipment and barriers were already in place, and they unchained the equipment and set up the roadblock.

7.8 Coordination Efforts

The overall consensus from the interviews was that the coordination and cooperation of all of the entities involved was successful. While there may have been initial internal bickering in one of the incidents, the differences were put aside to make the evacuation and incident management a success.

The Graniteville, South Carolina, incident required the activation of the South Carolina Mobilization Plan that allowed for a coordinated request for support resources and agencies. Firefighters from around the state participated in the incident.

Public transit agencies played a factor in the evacuation of Big Bear Valley, and through their coordination of efforts, the evacuation of residents without transportation was successful.

7.9 Decision Making

All of the incidents reviewed involved the introduction of an incident command system that generally morphed into a unified command structure. All of the incidents involved had the respective fire departments initially lead the incident command system.

Generally, the decision to evacuate was made by the incident commander in consultation with other senior staff and advisors. There generally were discussions revolving around the incident, time needed to evacuate, the type of evacuation to call for, etc. Based on the interviews, there was a collaborative approach to issuing evacuation orders.

7.10 Difficulties in the Incident/Evacuation

All of the incidents reviewed involved some difficulty in either the incident and/or evacuation, and they varied per incident. The following difficulties per incident are identified below.

El Dorado, Arkansas

- Determination of the chemical involved
- Legal actions
- Receipt of information from other entities.

Graniteville, South Carolina

- Internal bickering with the establishment of the initial incident command center
- Loss of the main fire station.

South Salt Lake City, Utah

- Identification of the chemicals on the leaking rail car
- Incorrect train manifest.

Tools cited as being needed due to the difficulty of the South Salt Lake City incident are continued use of placards on the sides of the railcars indicating the product in the rail car and regulations on how to properly load rail cars.

Big Bear Valley, California

- Incompatible communication systems
- No communication once the valley incident commander left the incident command center.

7.11 After-Action Reports

Several after-action reports were issued for the incidents. Either they have been included in the Appendix of this report or a Web address has been provided.

7.12 Special Needs Evacuations

The following information focuses on special needs evacuations from the four case studies. However, before providing specific information, the focus of the special needs evacuations is identified below for all incidents.

7.12.1 Focus

Much like the focus of the emergency management officials, the focus of all of the special needs evacuations was initially to evacuate residents, staff, students, etc. from the incident zone.

However, during the El Dorado incident other focuses arose such as:

- Sheltering in place or evacuating – Oakridge Nursing Home.
- Getting nursing home residents out of the home and gathering up bedding, linen, other items, and food – Hillsboro Manor Nursing Home.

- Keeping the communication lines open since people were calling in seeking information, typing up the lines – Oakridge Nursing Home.

During the Big Bear Valley incident, the Bear Valley Community Hospital wanted to find one facility that could accommodate all of the residents.

After the initial evacuation, the focus changed depending on the type of institution that was evacuated.

During the evacuation, the focus shifted to the following.

- Getting residents ready for the evacuation, dealing with anxious staff whose homes were under an evacuation order, and dealing with family members who were contacting the hospital for information and the evacuation location – Bear Valley Community Hospital.
- Securing the safety of the residents and the transportation of wheelchair-bound residents – Oakridge Nursing Home.
- Dealing with the slowness of the ambulance used to transport the wheelchair-bound residents – Oakridge Nursing Home.
- Trying not to upset the residents, contacting family members, and not fielding calls from outside the facility – Hillsboro Manor Nursing Home.
- Having an orderly process for parents to be reunited with their children – Big Bear Middle School.

After the evacuation, the focus shifted to:

- Contacting the Red Cross for the cots, setting up the cots, feeding and calming the residents – Hillsboro Manor Nursing Home.
- Getting staff to evacuate themselves – Big Bear Middle School.
- Making sure the residents received the care they were accustomed to and keeping the residents calm due to unfamiliar surroundings and people– Bear Valley Community Hospital.
- Making residents comfortable and taking care of them – Oakridge Nursing Home.

7.12.2 El Dorado, Arkansas – El Dorado County Jail Facility

The sheriff found out about the incident by either hearing or seeing the explosion and fire. The sheriff directly went to the Teris facility for information on the incident and was told of the recommendation to evacuate the jail facility. Upon receipt of this information, the sheriff contacted the LEPC, and it was determined that the county jail needed to be evacuated and his staff was needed for that purpose.

Transportation Impacts

When the sheriff decided to evacuate the jail facility, a choice of which roadways to use was made. It was determined that the convoy would proceed down state roadways rather than county roadways due to several factors: (a) the state roadways were felt to be more secure; (b) there were wide shoulders, and in case of an accident, the buses could be moved off to the shoulder or, in the case of an automobile accident, the automobile could be moved off to the shoulder not impeding the movement of the buses; and (c) there are more lanes allowing for faster speeds and movement past an accident.

Lessons Learned

There were some lessons learned regarding “little bitty things such as how to coordinate prisoners and separate them and secure them.”

After the evacuation of the jail facility, the sheriff looked into the feasibility of providing a separate air supply for the emergency dispatch center, but it was determined to be too costly. However, approximately four to five self-breathing apparatuses were purchased and are on site at the county jail in case of need.

Why a Success

The sheriff felt that there has always been the threat of an evacuation, and he had “years to think about it.” He communicated the plan with two others on his staff, the chief deputy and the jail administrator, so they knew what to do in case the sheriff was incapacitated. To ensure someone is available who knows the plan, the sheriff requires that all three persons are not off duty at the same time. There is at least one of them on site at all times. The sheriff realizes that the evacuation plan should be written down and taught to others of his staff, but this may not happen in the foreseeable future due to a lack of resources.

7.12.3 El Dorado, Arkansas – Hillsboro Manor Nursing Home

The director of nursing received a page from the 911 system while attending church and was told to be prepared to evacuate and to prepare for a return call to evacuate. After this initial contact, Hillsboro started to evacuate the residents before the order to evacuate was received. Shortly thereafter, a call was received to evacuate the nursing home.

Transportation

The police department and volunteers from the community acquired buses for the transportation of residents to their designated public shelter. There were approximately 96 patients and more than 50 staff that needed to be evacuated. Most of the residents could be moved by either school or church bus (regular and wheelchair accessible), but residents who could not walk were transported by ambulances to the hospital or other nursing homes.

One man from a church brought a truck that was used to move wheelchairs, bedding, linen, the medicine carts, and food prepared for lunch.

The police department provided an escort to the public shelter.

Lessons Learned

There are several lessons learned:

- Be prepared and delegate responsibility to others to help during an emergency.
- Give people a designated assignment.
- Have drills and know what everyone’s role is.
- “It was a good experience, something deadly could have happened. It makes you understand and appreciate who you rely on. Take care of your own.”
- Request wheelchair lift-equipped buses. This type of equipment facilitates the entry and exit of the residents onto and off the buses.
- Through firsthand experience, Hillsboro knows its own abilities and which churches have what form of transportation and who to contact first.

Why a Success

There are numerous reasons why the evacuation was a success:

- Community volunteers assisted in the evacuation, such as by providing a truck to transport items or church buses to transport residents and staff.
- There was easy access to transportation.
- Hillsboro had written procedures on evacuations.
- The delegation and assignment of activities to staff kept the staff focused on the evacuation and not on what-if scenarios. The nursing home had practiced, at least annually, an emergency drill for evacuation of the nursing home
- There was the experience of previous partial evacuations.

7.12.4 El Dorado, Arkansas – Oakridge Nursing Home

At 9:30 on Sunday morning, the assistant administrator was contacted at home and informed by the 911 system that the Teris plant was exploding. Within 10 minutes of the phone call, the assistant administrator arrived at the nursing home. At this point, it was decided to start shelter-in-place procedures.

After this initial activity, the assistant administrator was waiting for the word to evacuate Oakridge. Approximately 1 hour after the initial call, someone from a church arrived to help Oakridge evacuate. This individual informed the assistant administrator that “everyone was evacuating,” and the evacuation started at this point.

Concerns

There was no official call from the local emergency management officials for an evacuation, nor were there Red Cross officials assisting in the evacuation. The assistant administrator would have liked to have emergency officials helping during the evacuation. “If not for the churches and family members, we would have had a problem.”

The assistant administrator would have liked to know who they could call on and who would call on them in case of a next time. He did not like volunteers informing him of the need to evacuate. There needs to be “better communication from an official person.” He called after the incident and received an apology.

Transportation

A total of six church and school buses were used to evacuate the residents. One of the school buses was wheelchair-lift equipped, and Oakridge could have used more of those types of buses.

Lessons Learned

There were several lessons learned:

- Examine the space of a facility to be used as a shelter and ensure it meets your needs for space, accommodations, restrooms, and a kitchen.
- Not everything needed for an overnight evacuation was taken initially, such as diapers, supplies, and feeding pumps. Plan for the need to gather up supplies during an evacuation and have assigned staff to gather up the supplies.

Why a Success

Oakridge staff have received training on evacuation and reviewed the shelter in place video. That information combined with the knowledge of how to handle other types of emergencies led to a successful self-evacuation.

7.12.5 Graniteville, South Carolina

Residents who evacuated left behind their pets and later became concerned when they realized the extent of the incident. The Aiken County Animal Control Department called on other animal control departments to assist in the retrieval of pets from the evacuation zone. Evacuees contacted animal control with pet information and keys to their homes. Once the pets were retrieved, evacuees had to contact animal control and set up an appointment to pick up their pet. As a result, more than 287 pets were reunited with their owners.

7.12.6 Big Bear Valley, California – Bear Valley Community Hospital

Bear Valley Community Hospital long-term residents were evacuated. Once the decision was made to evacuate the community, the hospital instituted an internal disaster plan. When the hospital was informed of a voluntary evacuation, the director of nursing provided guidance to staff and delegated responsibilities to perform certain tasks. Some staff were directed to prepare the residents for an evacuation, pack up residents' medical records, pack up 3 days of food, pick up the medications, call in additional clinical staff, and contact families. By delegating tasks, the staff were focused on the evacuation of patients and not necessarily the fire situation.

By the time the ambulances arrived at the hospital, residents and staff were ready to leave. To facilitate information regarding a resident, the residents' individual medical file went along with the patients, in addition to their medication.

Lessons Learned

There were several lessons learned:

- Create a disaster book with emergency contact information and local nursing homes phone numbers.
- Ensure staff have cell phones for communication purposes.
- Have a written evacuation plan that is shared with the staff.
- Maintain a current list of emergency contacts for residents, patients, and staff. Staff information should include home number, cell phone number, and emergency contact numbers.
- Ensure there is a place to send residents/patients during an emergency. There are now verbal agreements with other facilities for the evacuation of patients/residents.
- Pack supplies for longer than 3 days. Residents were away from the hospital for 5 days.

Why a Success

The evacuation of the hospital was coordinated with the Bear City Fire Department and the City of Big Bear Lake Emergency Management Services through the Emergency Operations Center. A week before the evacuation occurred, the fire chief contacted the hospital and conducted pre-disaster planning such as, if the need for an evacuation was

clear, what type of transportation was needed and from where would the transportation come.

The hospital also participates in tabletop exercises and understands its roles and responsibilities. Preplanning for the evacuation assisted in the successful evacuation of the hospital.

7.12.7 Big Bear Valley, California – Bear Valley Schools

Schools in Big Bear Valley were evacuated. The day before the evacuation of the valley, the superintendent of the schools was informed of the potential for an evacuation and passed this information along to staff of the school district. Students of the schools were sent home. District staff were told that the local emergency management officials would not try to evacuate when school was in session. However, the next day after students were at school, the winds picked up and a mandatory evacuation of the valley occurred.

Lessons Learned

There were several lessons learned:

- If family is not available, friends can be contacted to pick up a student. Some of the family members work off the mountain and had difficulty in returning to the valley.
- Almost every student had a cell phone. The school policy is not to allow students to use cell phones while in school. During this incident, when the students were in the gymnasium, they called their parents to inform them of the school closing. After this incident, the high school has considered relaxing this school policy.
- Use a workaround for a communication issue. The landlines were lost, there was no radio repeater, and the handheld radios worked for approximately a mile. Communication back to the district office was problematic, so a workaround was to position school buses at a jump point where a bus could be contacted, who in turn contacted another bus and so forth until the district office was contacted.

Why a Success

The evacuation of schools in Big Bear Valley was a success due to several factors.

- An orderly process was developed to allow parents to pick up their children in a calm setting.
- There was school training for emergency drills.
- The Big Bear Valley incident commander decided to hold off announcement of an evacuation until the school children arrived at school, thus allowing for an orderly evacuation of students.

7.13 Best Practices

All of the incidents reviewed used some best practices regarding evacuation management to a degree. The following best practices were identified based on the interviews.

- Ability to change procedures on the fly
- Communication workarounds
- Controlling a potential chaotic scene with evacuation procedures
- Daily meetings
- Fact sheets and press briefings
- Joint information center

- Pet unification plan
- Placement of an incident command quickly
- Town hall meetings
- Training, including tabletop exercises
- Unified incident command
- Use of the 2-1-1 system for human and volunteer services
- Use of an incident command
- Use of the national incident management system.

7.14 Lessons Learned

Numerous lessons were learned in each of the incidents. The following is a summary of these lessons by the categories of advance planning, advanced technology, coordination, communication, and transportation.

7.14.1 Advance Planning

Within advance planning, there are subsets of lessons learned such as identification, plans, supplies, staff, systems, and training.

Identification

- Improve access control/site security and provide visual identification for command staff – South Salt Lake City, Utah.
- Issue identification passes – Big Bear Valley, California.
- Provide standardized identification badges – Graniteville, South Carolina.
- Use vehicle placards to allow for vehicle reentry – Big Bear Valley, California.

Plans

- Adopt a reentry plan – Big Bear Valley, California.
- Determine levels of protection prior to entry of incident zone – Graniteville, South Carolina.
- Establish the command post further away so it does not need to be moved – South Salt Lake City, Utah.
- Keep current with the emergency management plan – El Dorado, Arkansas.
- Know the resources of private industry in the area – South Salt Lake City, Utah.
- Identify relocation facilities ahead of time – Big Bear Valley, California.
- Review incidents (including others) for lessons to be learned – El Dorado, Arkansas.
- Test the emergency plan to see if it works – El Dorado, Arkansas.

Supplies

- Provide enough protective gear – South Salt Lake City, Utah.
- Remember to carry extra cell phone batteries and/or chargers – South Salt Lake City, Utah.

Staff

- Employ additional staff early in the incident – South Salt Lake City, Utah.
- Ensure nursing staff at public shelters – South Salt Lake City, Utah.
- Utilize traffic engineers earlier in the incident – South Salt Lake City, Utah.

Systems

- Activate the reverse 911® system at incident command – Graniteville, South Carolina.
- Adopt a neighborhood-specific early warning system, if the budget allows – El Dorado, Arkansas.
- Ensure emergency alert system is working – Graniteville, South Carolina.
- Request samples of product during the initial reconnaissance for quicker laboratory analysis and ensure chain of custody of the samples – South Salt Lake City, Utah.

Training

- Provide for additional multi-entity training – Graniteville, South Carolina.
- Provide additional training on hazardous materials – Graniteville, South Carolina.
- Review and incorporate the incident into the fire department training process – South Salt Lake City, Utah.

7.14.2 Advanced Technology

- Use technology/tools during the incident – Graniteville, South Carolina.

7.14.3 Coordination

- Activate local emergency planning committee members early in the incident – El Dorado, Arkansas.
- Use a national incident management system – El Dorado, Arkansas.
- Verify mutual-aid sources – Graniteville, South Carolina.

7.14.4 Communication

- Ensure notification of the evacuation to dispatch center – South Salt Lake City, Utah.
- Ensure the Reverse 911® system has current information – Graniteville, South Carolina.
- Examine a handheld communication device for communication purposes – South Salt Lake City, Utah.
- Have secure lines of communication – Big Bear Valley, California.
- Keep a current list of media contacts and include alternate numbers – El Dorado, Arkansas.
- Make sure the call-out list has correct contacts – South Salt Lake City, Utah.
- Make sure entity representative can be found – South Salt Lake City, Utah.
- Open a joint information center earlier in an incident – South Salt Lake City, Utah.
- Provide your own public information officer – Graniteville, South Carolina.
- Provide additional public information officers – South Salt Lake City, Utah.
- Use Reverse 911® to alert the community – El Dorado, Arkansas.
- Use a unified information center – El Dorado, Arkansas.

7.14.5 Transportation

- Be careful in selecting roadways for the transportation of prisoners – El Dorado, Arkansas.
- Know the location of specialized equipment to transport nursing home residents – El Dorado, Arkansas.

7.15 What Worked and What Did Not Work

Evacuations as a result of the incidents were successful; however, as with any emergency, some things worked well and others did not. The following is a summary of this information by the categories of advance planning, coordination, and communication.

7.15.1 What Worked

Advance Planning

- Ability to adapt to an ever-changing and growing incident
- Mountain Area Safety Taskforce (MAST)
- Practice and experience of various entities
- Pre-established roadblock equipment
- Preplanning, training, and drills
- Pre-established relationships among entities
- State of readiness of the local emergency planning committee and knowledge of an eventual major disaster event
- Training
- Training exercises, inclusion of hospital in tabletop exercises
- Training of first responders in incident command
- Unified incident command
- Use of the 2-1-1 system for social services
- Use of the national incident management system.

Coordination

- Cooperation of the railroads
- Development of relationships with other entities
- Establishment of an incident command quickly
- One person in charge and delegation of responsibilities
- Overall cooperation of the entities involved
- Quick implementation of an incident command center
- Use of the national response plan.

Communication

- Information to the media and the public
- Joint information center
- Media web page.

7.15.2 What Did Not Work

Advance Planning

- Not all involved entities were represented at the incident command center
- Staff assignments
- No identification of all of the chemicals located in the rail car
- No reentry plan
- Pumping of the rail car before the identification of the chemicals
- Sample material did not match the rail car manifest.

Coordination

- Internal bickering over leadership of the incident command
- Duplication of effort.

Communication

- Acquisition of information from others
- No utilization of existing ITS technology
- No official evacuation notice to a nursing home
- Stopped communication.

7.16 Improvements for Next Time

Each incident had a successful evacuation, but there are always improvements that can be made to either incident and/or evacuation management. The following is a summary by incident.

7.16.1 El Dorado, Arkansas

- Ensure contact numbers for all institutions such as nursing homes, assisted living centers, and hospitals have the latest contact information. Confirm and periodically update the contact information.
- Have written evacuation procedures for the county jail that are available for the staff and incorporate the procedures into the training of new staff. Include in the procedures information on who can be contacted for the provision of transportation, temporary detention facilities, and overnight detention facilities.
- Have one entity follow up on the evacuation of institutions to ensure that the proper institution was evacuated.

7.16.2 Graniteville, South Carolina

- Direct evacuees to public shelters, if this information is known ahead of time.
- Ensure that residents without transportation are evacuated.
- Ensure the 2-1-1 system can be accessed from cell phones.
- Ensure the 2-1-1 system has all of the information needed to provide social service information to evacuees and the general public.
- Establish an incident command center without internal bickering; this may be improved through the use of regular training sessions.
- Provide joint multiple-entity training including emergency operations and incident command.

7.16.3 South Salt Lake City, Utah

- Canvas private industry prior to an incident for resources and equipment that can be used during an incident.
- Control access to the incident and establish a uniform identification badge for authorized personnel and identification vests for command staff.
- Ensure the chain of custody of a sample product.
- Preplan for the location of the command center so it does not need to be moved.
- Provide continual training with the railroad.
- Speed up the sample process and quickly identify the product.

7.16.4 Big Bear Valley, California

- Evacuate residents off the mountain and not up the mountain. Communities to the west of Big Bear Valley were evacuated to the valley, which was itself evacuated. Some people evacuated twice.
- Have full-scale training exercises with multiple entities, including the hospital and transit agencies.
- Have written agreements with nursing homes and/or hospitals for the settlement of evacuated patients/residents.
- Provide traffic information that can be accessed by driver handheld devices.
- “Wire” the valley for ITS technology.

8 Recommendations for Improved Evacuation Transportation Planning and Management Methods

Improvements that can be made to evacuation transportation planning and management methods revolve around additional tools for evacuation management. The tools identified are currently available in most states. They are low-cost tools that can provide additional information or services to communities during times of crises.

8.1 Devices

8.1.1 Handheld Communication Devices

In several of the case studies, a compact handheld communication device was expressed as being potentially useful in the field. It could eliminate the radio and be small enough to allow for both voice and text messaging. It could also be used to communicate to forward command, to others in the field, or up to the command center.

With the use of a handheld device, there is the possibility of introducing Internet access in the field. Internet access allows public information officers the ability to post information, answer media questions, and communicate to the public in a real-time mode. It allows information to flow from the field to the general public in a very short period of time and could allow for the general public to react quickly to a possible evacuation order. Internet access provides an additional means of communication to the general public regarding an incident.

8.1.2 Portable Message Signs

Portable message signs were used in a few of the case studies to communicate information to the general public regarding roadway conditions. Portable message signs can prove to be invaluable when local entity resources are required to provide a soft closure of a roadway or provide information to the general public on possible incident areas.

The Utah Department of Transportation found in a public opinion poll that 70 percent of the public would change their travel plans if they have information on possible incidents. A portable message sign allows for people in the field to quickly communicate information to the public regarding roadways and incidents and allows people to alter their plans before entering the incident zone. Portable message signs allow people to make informed choices while traveling, possibly leading to reduced congestion at an incident zone.

8.2 Services

8.2.1 2-1-1 System

A new 2-1-1 system provides social services information to citizens during times of crises and is currently available in 32 states. 2-1-1 is a human resources referral agency that “provides callers with information about and referrals to human services for everyday needs and in times of crisis. For example, 2-1-1 can offer access to the following types of services:

- Basic Human Needs Resource: food banks, clothing closets, shelters, rent assistance, utility assistance.
- Physical and Mental Health Resources: health insurance programs, Medicaid and Medicare, maternal health, Children's Health Insurance Program, medical information lines, crisis intervention services, support groups, counseling, drug and alcohol intervention and rehabilitation,” as reported on the 211.org Web site.

During the Graniteville incident, the Salvation Army/United Way manned the telephone line and was a “talking human resource directory” for residents of the community. Information ranged from what we can do to help, to what agencies can help, to where we can go to get food. The 2-1-1 system moved telephone traffic away from the 911 system and allowed the 911 system to remain open for emergency use.

Safe Community Alert Network (SCAN)

One fire department interviewed for this report mentioned its department signed up for a communication system called SCAN that provides emergency management information to both the public and emergency responders.

According to SCAN it is “a public warning system that allows local police departments, fire departments, emergency management services organizations, schools and public safety agencies to broadcast emergency information directly to the computers, mobile phones, pagers and personal digital assistants of their neighborhood and local residents”. Through SCAN, residents can now receive immediate alerts for neighborhood crime and terrorism, sexual predators moving into the area, weather and natural disasters, cyber attacks, fire advisories, health emergencies, as well as neighborhood public safety information.

The SCAN service broadcasts alerts as they become available in the zip code areas for which users have registered. SCAN maintains a 24-hour, 7-day service and support bureau that collects and reviews alert content and broadcasts those alerts to those registered users that have opted-in to the SCAN service.

Registered users receive the SCAN service free of charge. SCAN is free of charge to all public safety agencies of all types, municipal, county, state and federal, as well as schools, colleges and universities, and hospitals.

SCAN is available now to all US residents. Agencies are broadcasting alerts throughout California, Nevada, and Texas. As of the writing of this document, agencies in other states will be broadcasting alerts to their residents as they come online with the SCAN service during 2005.

SCAN is presented by SCAN USA Corporation and parent company Sharp Holding Corporation through a public-private partnership in conjunction with the National Coalition of Public Safety Officers (NCP SO), the California Organization of Police and Sheriffs (COPS), and SBC Communications.

This service was first launched on December 17, 2004, in Bell Gardens, California.

As reported by Fox 5 News (www.kvvu.com) on September 13, 2005, the:

Las Vegas Metro Police Department (LVMPD) announced today it will soon begin using SCAN USA as a means of sending emergency alert messages to members of the outlying communities. These alerts will warn residents of dangerous conditions such as fire, flood, or avalanche. Through SCAN USA, LVMPD will be able to send these alerts directly to the computers, mobile phones, personal digital assistants, pagers and fax machines of the residents it serves.

LVMPD is encouraging residents to register free of charge to receive these alerts, at www.SCANUSA.com. In the past, it has been extremely difficult to ensure all of the residents have been notified in a timely manner of a pending emergency.

SCAN USA is part of a national alert system that allows public safety and law enforcement departments to broadcast localized emergency information directly to the computer, mobile phones, and personal digital assistants of its citizens. With SCAN USA, law enforcement and public safety agencies can communicate almost instantaneously with neighborhood residents to provide them with information that can help protect their family, friends and neighbors.

SCAN is a free service to public agencies and the consumer that allows for text messaging or Web messaging of public service announcements. The consumer can specify the type of message they want to receive, and the message can be sent to personal digital assistants, cell phones, pagers, computers, etc. In addition, an entity can use the service to notify special staff, such as Emergency Operations Center staff, with the use of a password.

9 Appendix

9.1 Appendix 1 – Organizations Contacted

Entities Contacted for the El Dorado, Arkansas, Incident

- City of El Dorado Fire Department
- City of El Dorado Police Department
- County of El Dorado, County Judge
- Hillsboro Manor Nursing Home
- Hudson Memorial Nursing Home
- Oakridge Nursing Home
- ProMed Ambulance Service – Local Emergency Planning Committee
- State of Arkansas, Department of Environmental Quality
- Teris
- Union County Emergency Management – Local Emergency Planning Committee
- Union County Sheriff's Department
- US Environmental Protection Agency – Region 6

Entities Contacted for the Graniteville, South Carolina, Incident

- Aiken County Emergency Services
- Aiken County Sheriff's Office
- American Red Cross, Aiken, South Carolina
- Avondale Mills
- Doctors Hospital, Augusta, Georgia
- Federal Centers for Disease Control and Prevention
- GVW Fire Department, Graniteville, South Carolina
- State of South Carolina, Office of Regulator State (Rail Inspections)
- State Senator

Entities Contacted for the South Salt Lake City, Utah, Incident

- Federal Railroad Administration
- Local Emergency Planning Committee – Salt Lake County
- Red Cross
- South Salt Lake City Valley Health Department
- South Salt Lake City – City Prosecutor
- South Salt Lake City Fire Department
- South Salt Lake City Police Department
- State of Utah – Highway Patrol
- Union Pacific
- Utah Department of Transportation

Entities Contacted for the Big Bear Valley, California, Incident

- Baldwin Lane Elementary School
- Big Bear City Fire Department
- Big Bear Lake Fire Department

- Big Bear Lake Sheriff's Department
- Big Bear Middle School
- Bear Valley Community Hospital
- Bear Valley Unified School District
- California Department of Forestry and Fire Protection – San Bernardino
- California Department of Transportation – Fawnskin Maintenance Station
- California Highway Patrol
- Crest Forest Fire District
- Mountain Area Regional Transit Authority, Big Bear Lake
- Omnitrans, San Bernardino
- Red Cross – San Bernardino

9.2 Appendix 2 – EPA After-Action Report

	<p style="text-align: center;"><u>EMERGENCY RESPONSE REVIEW</u></p> <p style="text-align: center;">Teris LLC Explosion and Fire, El Dorado, Arkansas</p> <p style="text-align: center;">FINAL REPORT, March 28, 2005</p> <p style="text-align: center;">Steve Mason—EPA Region 6, Emergency Readiness Team Response & Prevention Branch, 1445 Ross Avenue, Dallas Texas 75202 214-665-2292 mason.steve@epa.gov</p>
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The Environmental Protection Agency (EPA) Region 6 is issuing the Emergency Response Review as part of its ongoing effort to protect human health and the environment by responding effectively to chemical accidents. Emergency Response Reviews are designed to:

- Review with a local community and state officials the response procedures and outcomes to a specific chemical accident, affecting that community;
- Share information about chemical response safety practices;
- Develop potential recommendations and lessons learned to more effectively respond to an accidental release in the future;
- Build cooperation among local, state, and federal government agencies.

Emergency Response Reviews are entirely voluntary and may include all local, state and federal entities involved with the response, as well as the responsible party and their representatives.

This document does not substitute for EPA's regulations, nor is it a regulation itself. It cannot impose legally binding requirements on EPA, states, or the regulated community, and may not apply to a particular situation based upon circumstances. This guidance does not represent final agency action, and may change in the future, as appropriate.

SUMMARY OF INCIDENT

On the morning of January 2, 2005, a report to the National Response Center indicated an explosion and fire has occurred at the Teris LLC facility in El Dorado, Arkansas. The initial explosion occurred at approximately 0800 hours.

The facility reported initially that an employee attempted to extinguish a small fire within a warehouse storing various waste containers, but that the fire soon grew out of control.

The cause of the accident is not addressed within this report.

Response organizations (El Dorado Fire and Police Departments, as well as the Union County Sheriff Department) quickly responded and established a unified command with the Teris personnel to establish a strategy and response procedures for dealing with the emergency.

Local responders closed nearby streets, as well as evacuating approximately 200 residents downwind from the facility.

EPA Region 6 dispatched its Airborne Spectral and Photographic Environmental Technology (ASPECT) plan to monitor the plume. Preliminary review of the data collected by ASPECT showed low concentrations of trimethylamine in the immediate downwind plume. No other significant compounds or concentrations were detected.

Fire fighting was conducted by Teris personnel on-site, with off-site assistance from the local response organizations.

Due to the reactive wastes involved in the fire, water was not used as an extinguishing agent. Efforts focused on cooling areas not involved in the fire, as well as movement of materials not involved.

By 1900 hours on January 2, local officials lifted part of the evacuation area. By 1600 hours on January 3, all evacuations and road closures were lifted.

On-going monitoring of the ambient air was conducted by the Center for Toxicology and Environmental Health (CTEH), who was contracted by Teris. Additionally, EPA START contractors monitoring throughout the community.

No significant concentrations of contaminants were detected during the air monitoring efforts. CTEH did detect elevated levels of particulate matter immediately adjacent to the scene.

Sampling was conducted by Teris, with EPA and Arkansas Department of Environmental Quality (ADEQ) coordination, from fire suppression runoff. These samples were to be analyzed to determine proper disposal of this water runoff.

Additionally, wipe samples were collected by Teris (CTEH), in coordination with EPA, ADEQ, and Arkansas Department of Health (ADH) at 10 locations within the community.

Teris contracted with a remediation company (HEPACO) to relocate drums not involved in the fire, as well as remediation of the warehouse after the fire is extinguished.

EPA discontinued air monitoring and demobilized from the scene on January 6. Teris continued to work with local response officials, as well as ADEQ and ADH, on remediation efforts.

A review of the response was scheduled on conducted by EPA with State and local officials on

All attendees at the review agreed that the response was handled professionally and to the best of the capabilities of the local response officials.

Any additional information inquiries concerning this response should be directed to:

Floys McAdoo, El Dorado Fire Department, 870-863-8129

or

firechief@eldoradoar.org

OBSERVATIONS/RECOMMENDATIONS

<p>Observation/ Recommendation #1</p>	<p>All local response organizations should review protocols based on the following:</p> <p>Response teams to a disaster scene have a responsibility to first protect themselves and their team members. If you or your team is injured, not only are the number of victims increased, but the response is now delayed, resulting in additional resource utilization. This delay and need for additional resources due to your inability to keep yourself and your team protected could cost other victims their lives.</p> <p style="text-align: center;">DISASTER Paradigm: Safety and Security</p> <p>Don't be selfish—Protect yourself. Scene Priorities:</p> <ul style="list-style-type: none"> • Protect yourself and your team members first • Protect the Public • Protect the patients • Protect the Environment <p style="text-align: center;"><i>"Basic Disaster Life Support Manual, Version 2.5"</i></p> <p>At an incident, safety should be the first concern of any responder. When fire fighters, police officers or emergency medical technicians become injured or contaminated, they become part of the problem, instead of the solution. It's unfair to ask first responders to risk their life, health or the health of their families by becoming contaminated at an incident. Difficult decisions need to be made and risks taken should be weighed against the possibility of a positive outcome.</p> <ul style="list-style-type: none"> • OSHA 29 CFR 1910.120—Hazardous Waste Operations and Emergency Response (HAZWOPER) • OSHA 29 CFR 1910.134—Respiratory Protection (Commonly referred to in the fire service as the Two In/Two Out Rule) • EPA 40 CFR 311—Worker Protection • NFPA 471—Recommended Practice for Responding to Hazardous Materials Incidents • NFPA 472—Professional Competence of Responders to Hazardous Materials Incidents • NFPA 473—Competencies for Emergency Medical Personnel Responding the Hazardous Materials Incidents • NFPA 1500—Standard on Fire Department Occupational Safety and Health Program
<p>Observation/ Recommendation #2</p>	<ul style="list-style-type: none"> • Local governments that respond to hazardous materials emergencies should always be aware of the potential for reimbursement under the Local Government Reimbursement program, operated through EPA. More information on this program can be found at: http://www.epa.gov/superfund/programs/er/lgr/

Observation/ Recommendation #3	<ul style="list-style-type: none"> Response Organizations within Union County should ensure they have the 24-hour phone numbers for both EPA Region 6 (866-372-7745) and ADEM (800-322-4012), as well as the phone number for the National Response Center (NRC 800-424-8802) and CHEMTREC (800-424-9300).
Observation/ Recommendation #4	<ul style="list-style-type: none"> During the initial response actions, officials attempted to contact local radio stations to broadcast precautionary measures for residents. Due to the day and time, the stations were operating automatically and were not manned. The Union County LEPC should work with the local broadcast outlets to determine procedures for advising citizens of emergency situations 24 hours a day, 7 days a week. This could include override systems maintained at local response organizations and/or better off-hour contact information for the stations.
Observation/ Recommendation #5	<ul style="list-style-type: none"> Union County has worked hard to maintain and active LEPC. EPA Region 6, as well as the State of Arkansas, appreciates this effort. The LEPC should be aware of the State and EPA assistance programs to ensure future success.

Each of the emergency response reviews conducted within Region 6 show one consistent pattern: Emergency response personnel within Region 6 are to be commended for their professionalism and sincere desire to protect the citizens of their communities.

Region 6 EPA is grateful for the efforts made by all emergency response personnel, and hopes the above recommendations can be used to improve the response and preparedness readiness of the community, if a future emergency occurs.

9.3 Appendix 3 – Entities Involved in Graniteville, South Carolina, Incident

Graniteville Train Derailment January 6-9, 2005

County Government Agencies

Aiken Sheriff
Aiken EMD
Aiken Public Works
Aiken Cobra
Barnwell Sheriff
Barnwell EMA
Edgefield Sheriff
Edgefield EMD
Allendale Sheriff
Allendale EMA
Lexington Sheriff
Richland Sheriff
Richland ESD
McCormick Sheriff
Orangeburg Sheriff
Columbia, GA
Richland County Animal Control
Horry County Animal Control
Orangeburg County Animal Control (Sheriff's Office)
Greenwood County Sheriff

State Agencies

Governor Office
(SCEMD) SC Emergency Management Division
(CIO) Chief Information Office
(ORS) Office of Regulatory Staff
(DHEC) Department of Health Environmental Control
(SLED) State Law Enforcement Department
(LLR) Labor Licensing Regulation (SC OSHA)
SC Highway Patrol
SC State Transport Police
(DNR) Department of Natural Resources
(DOT) SC Department of Transportation
SC Dept of Education
SC Fire Academy
SC State Guard
Department of Mental Health (DMH)

Local Police Departments

New Ellington PD
Cayce PD
West Columbia PD
Columbia PD
Burnettown PD
North Augusta PD
Aiken City PD
USC-Aiken PD
Edgefield City PD
McCormick City PD
Charleston PD
Johnston City PD
Orangeburg City PD
Wackenhut (SRS)
Lexington City PD
Aiken City Animal Control
N. Augusta Animal Control

Federal Government Agencies

NTSB
EPA
FEMA Region IV
FBI
Fort Gordon
Federal Railroad Administration (FRA)
US Coast Guard
US Postal Service Inspector (Police)
CDC
OSHA

Volunteer Agencies

American Red Cross
Salvation Army

Commercial Companies

Norfolk Southern Railroad
Olin
Bell South
Motorola (Palmetto 800)

Coroner's Offices

Aiken County
Richland County
Barnwell County
Edgefield County

Fire Departments

GVW Fire Department
Belvedere Fire Dept
Meriwether Fire Department
Sage Mill Fire Department
Aiken Public Safety
N. August Public Safety
Bath Fire Department
Langley Fire Department
Augusta-Richmond County Fire Department, GA
Aiken COBRA Team
Lexington County Fire Service

EMS Services

Aiken County EMS
Belvedere Rescue Squad
Aiken Rescue Squad
Jackson Rescue Squad
Palmetto Ambulance Service
Regional Ambulance Service
Gold Cross Ambulance Service
Capital City Ambulance Service
Williston Rescue Squad
Edgefield EMS

9.4 Appendix 4 – Aiken County Sheriff's Office Fact Sheet



Aiken County Sheriff's Office Fact Sheet

Contact Lt. Michael Frank
Telephone: (800) 645-6331
Pager: (803) 819-5105

01/06/05
9:00pm

Graniteville Train Collision and Hazardous Materials Spill

Victims

Authorities confirm the death toll has risen to eight victims. Five victims were discovered at the following Avondale Mills properties: Woodhead (2); Gregg (2); Steven Steam (1). The remaining victims were found in a truck on Leitner Street, a home on Main Street and at the crash site. Residents in the immediate area of the collision reported breathing difficulty and eye irritation. An estimated number of patients were treated at the following area hospitals.

- Aiken Regional Medical Centers: 87 (1 fatality 20 admissions)
- University Hospital: 80 (17 admissions)
- Medical College of Georgia: 30 (14 admissions)
- Doctor's Hospital: 30
- St. Joseph Hospital: 2 (2 admissions)
- Lexington Hospital: 5 (5 admissions)

Evacuation and Well Being Checks

Law enforcement officers found two deceased victims during evacuation and well being checks. Twelve individuals refused to leave their homes. Those without vehicles were transported by school buses to area shelters.

Evening Activities

Norfolk Southern representatives met with National Transportation Safety Board officials for an information exchange. The railroad planned to remove an estimated 26 undamaged railroad cars from the crash site.

As of 7:00 p.m., all HAZMAT responders had departed the crash site until 8:00 a.m. Friday.

A specialized unit from the US Coast Guard, working in cooperation with the Environmental Protection Agency, is sending an eight-member team to provide HAZMAT and air monitoring expertise.

Declaration of Emergency

Governor Mark Sanford at 12:00 p.m. declared a state of emergency in Aiken County.

Curfew

Aiken County Sheriff Michael Hunt imposed a curfew beginning at 6:00 p.m. until 7:00 a.m. for Graniteville residents living within a two-mile radius of the crash site.

Curfew Boundaries

North: Highway 191, Trolley Line Road to Highway 118

South: Pine Log Road

East: Highway 118 to Pine Log Road

West: Breezy Hill Road; Midland Drive; Legion Road to Pine Log Road

(over)

Norfolk Southern Family Assistance Center

Norfolk Southern Railroad has established a family assistance center for employees and their families at First Presbyterian Church, 224 Barnwell Avenue, Aiken. (803) 648-2662

Incident Description

About 2:40 a.m., an Avondale Mills employee reported two Norfolk Southern trains collided in downtown Graniteville, South Carolina. The collision caused the derailment of several cars, which toppled a tree and pinned a motorist inside her automobile. The collision ruptured a tanker car of the second train, which resulted in the airborne release of chlorine.

Graniteville Residents

Residents are instructed to stay at home. Close doors, windows and turn off all ventilation systems. Residents who choose to leave their homes cannot return until authorized by public safety.

Hazardous Materials

The following hazardous materials are present at the incident scene:

- Chlorine: poison gas, corrosive
- Cresol: poison, corrosive
- Sodium Hydroxide: corrosive

For more information, visit the South Carolina Department of Health and Environmental Control: <http://www.scdhec.net>

Decontamination Sites

Individuals who believe they have been exposed can seek assistance at the following locations:

- University of South Carolina—Aiken gymnasium parking lot.
- Midland Valley High School

Traffic

Motorists currently are being diverted away from Graniteville. Motorists should seek alternative routes to Augusta and Aiken, including Interstate 20.

Avondale Mills

Avondale Mills has suspended operations at the following mills in Graniteville and Warrentonville: Gregg, Woodhead, Hickman, Swint, Townsend, Graniteville and Warrentonville administrative office, Horse Creek, Warren, Stevens Steam, Sage Mill

Employees and their families are directed to seek information from company representatives at First Baptist Church of Aiken, 120 Chesterfield Street, Aiken, South Carolina.

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9.5 Appendix 5 – Things to Do Upon Your Return Home



Things to Do Upon Your Return Home

When you return to your home, we understand you will have concerns and questions about the safety of your home and belongings. Once you are allowed to go back into your house, the air that you breathe and the water that you drink and bathe in will be safe to use. Medications do not need to be discarded if stored in original, closed containers. The following are housekeeping steps you should take:

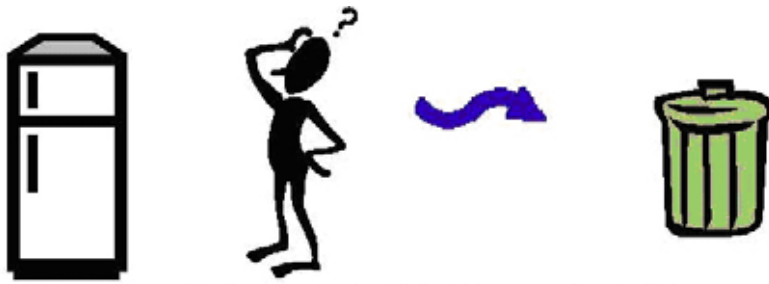
General

- Notify Norfolk Southern (NS) Systems Claims Office at 1-800-230-7049 for:
 - Electrical problems
 - Animal or pet needs
- Open doors and windows or run your heater/AC system for 30 minutes to circulate air.
- Run water from your kitchen tap for 2 minutes and flush all toilets to clear stagnant water.
- Additional things you may want to do: change the air intake filters in your heat and air system; wash clothing and bedding that was in the home; wipe off/wash children's playthings, wash animal bedding, and wipe/wash kitchen counters with water or mild soap. No special actions are needed for children, elderly residents or pregnant women. All items can be disposed with household trash.
- Mail delivery: The United States Post Office will resume regular mail delivery once the roads are re-opened. Therefore, nothing is required on your Part.

Food Items: When in Doubt, Throw it Out!

- Keep: Canned, unopened pre-packaged, frozen and refrigerated foods.
- Throw out: opened, unprotected food items left out in the open and any other items that could have spoiled while you were not home. If you lost power, refrigerated foods may have spoiled and you should throw out frozen foods that have thawed.

For questions regarding safety of a food item, you may contact SCDHEC at 642-1637 or the USDA Hotline at 1-800-535-4555.



When in Doubt, Throw it Out!

***9.6 Appendix 6 – Aiken County Emergency Services
After-Action Report***

Aiken County Government After-Action Report

Graniteville Train Wreck January 2005



Summary

On January 6, 2005, at approximately 02:45, two Norfolk Southern freight trains collided in Graniteville, South Carolina. The collision resulted in a catastrophic release of chlorine gas to the atmosphere from a tank car damaged in the derailment. This release rapidly vaporized to form a dense and highly toxic airborne cloud affecting Graniteville residents and employees of nearby Avondale Mill. Other hazardous materials cars involved in the derailment included 2 additional chlorine cars, 1 sodium hydroxide car and 1 creosol car.

More than 500 people sought medical evaluation, approximately 70 people were admitted to hospitals and 9 people were killed due to chlorine exposure.

Initial responding agencies from Aiken County included the Graniteville-Vaucluse-Warrentonville (GVW) Fire Department, Aiken County Emergency Medical Services (ACEMS), Aiken County Sheriff's Office (ACSO), Aiken Department of Public Safety (ADPS), Aiken County Hazardous Materials Team (ACHMT) and Aiken County Emergency Management Division (ACEMD). Approximately 600 Federal, state and local personnel participated in the response to this disaster.

This report will focus primarily on the actions and observations of the Aiken County agencies involved in the initial response.

Strengths and Improvement Items will be identified to document the Aiken County Emergency Services Department's ability to recognize, respond to, and control a hazardous materials emergency, as well as to coordinate an integrated response that will protect the health and safety of emergency response personnel, the general public and the environment.

Strengths are those areas in which responders demonstrated exceptional ability or knowledge, or other areas of programmatic solidity. Improvement Items are deviations or concerns regarding a particular issue. An Improvement Item, by itself, does not degrade the response, but the emergency response may be more effective if alternative measures were implemented. Strengths and Improvement Items will be identified utilizing objectives that are applicable to the agency's response authority.

OBJECTIVE 1: SAFETY

Demonstrate the ability for agency personnel to perform response activities safely.

Criteria 1: Emergency response agency members perform response activities safely.

STRENGTH

- ACEMS personnel experienced no injuries during the response.

IMPROVEMENT ITEM

- Habitability surveys were not conducted initially at Command Post or Forward Operations.
- First ACEMS unit responded directly to the scene and had to leave the area due to fumes. Entry should be coordinated with IC.

Criteria 2: Effective scene safety operations through appointment of Safety Officer position reporting to Incident Commander (IC).

IMPROVEMENT ITEM

- Safety Officer was not designated for EMS operations. Safety Officer responsibilities defaulted to ACEMS Shift Manager.

OBJECTIVE 2: PROTECTIVE ACTIONS

Demonstrate the ability to develop and implement appropriate protective actions.

Criteria 1: Determine/implement protective actions for the area.

IMPROVEMENT ITEM

- Reverse 911 was not activated in a timely manner due to access available only by Emergency Management personnel. This weakness has been corrected so that Reverse 911 can now be activated through direction from Dispatch supervisor or authorization of Incident Commander. Capability will also be established at North Augusta Public Safety and Aiken Public Safety dispatch centers.
- The database used to initiate calls was five years old. This was identified post incident and updated info is now available for input into the system.
- Public unaware that unlisted phone number results in not being on 911 call list.

Criteria 2: Demonstrate effective communications.

STRENGTH

- Key representatives of fire, law enforcement and emergency services at Command Post actively discussed evacuation versus shelter in place.

IMPROVEMENT ITEM

- ACEMD had to contact SC Emergency Management Division (SCEMD) to initiate the Emergency Alerting System (EAS) which only works if radio station is in auto position. ACEMD did not have (EAS) monitoring capability to determine if EAS message had been transmitted to citizens.
- SCEMD resource issues can impact initiation of EAS.
- Procedure to confirm dissemination of public protective action notifications should be developed.

OBJECTIVE 3: MITIGATION

Demonstrate the ability to properly mitigate, stabilize conditions and gain control over the emergency situation.

Criteria 1: The emergency response agency mitigates the emergency effectively.

STRENGTH

- US Environmental Protection Agency (EPA) stated that Geographical Information System (GIS) maps in place when they arrived were very beneficial to planning mitigation activities.

IMPROVEMENT ITEM

- Plume models and GIS mapping need to use same coordinates.

Criteria 2: The county EOC provides adequate support to assist in mitigating the incident.

STRENGTH

- ACEMD initiated early request for assistance from SC Emergency Management Division (SCEMD). 75% of State Emergency Support Functions were activated.
- ACEMS equipment needs were quickly met, once requested through the EOC. EOC personnel maintain a current list of resources.
- Shift turnovers were preplanned and worked well.
- School District representatives notified at approximately 3:30 am and decision was made to close schools prior to EOC activation.

IMPROVEMENT ITEM

- Credibility of EOC hampered by lack of a dedicated, adequate facility.
- Lack of coordination between EOC and CP affected logistics, food deliveries housing, etc. CP was duplicating effort, and info wasn't being shared effectively.
- Formal status briefings need to be conducted for EOC staff on a regular basis.

Criteria 4: Demonstrate Command and Control.

STRENGTH

- The Incident Command System and key positions were implemented early in response.

IMPROVEMENT ITEM

- Better communications between response personnel would have resulted in pertinent information sharing. Unified CP was in place when EPA arrived. Clear lines of authority had not been established, but the right things were occurring, although maybe not as smoothly as they could have.

Criteria 5: Agencies effectively integrate additional support into UC/EOC operations.

STRENGTH

- SC Department of Health and Environmental Control were well-informed of incident by time of arrival at CP.

IMPROVEMENT ITEM

- ACEMS supervisor was not present at initial Command Post (CP).
- Local/National Red Cross point of contact needed at the CP to coordinate food for personnel in outlying areas.
- National Red Cross position may be needed in the EOC.
- EPA personnel were initially unaware that the Aiken County EOC was operational.
- Aiken County GIS resources were not involved in UCP planning meetings.
- ACEMS observed additional EMS support arrive from outside Aiken County. Additional units were not coordinated with ACEMS.
- Large number of individuals at the CP did not have a reason to be there. Better identification of key command staff would have helped.
- State Fire Marshals were contacted through SC Firefighter Mobilization Plan without the knowledge of the Damage Assessment Chief in the EOC. A Mutual Aid Agreement is in place with the Building Officials Association of SC, but was not utilized initially.
- Shelter staffing issues arose when a shelter was opened without EOC coordination and/or knowledge of DSS/Red Cross. There is a potential for county liability and financial responsibility if the Red Cross has not been involved with shelter opening.

Criteria 6: Appropriate actions are taken to protect and account for emergency responders at the scene.

STRENGTH

- EMS Supervisor relayed info to arriving units within 10 minutes to stay clear of the incident scene.

IMPROVEMENT ITEM

- ACEMS access was restricted after first entry due to lack of PPE availability and to fit incomplete testing on equipment received from Department of Homeland Security.

- Accountability system (hazmat wristbands) implemented by Fire Department was not communicated to all responding agencies.
- Pre-determined accountability system needed for Aiken County emergency response agencies.
- Agency accountability was being maintained, but not being shared with other agencies.

OBJECTIVE 4: CHEMICAL MONITORING

Demonstrate the ability to minimize exposure and control chemical conditions.

Criteria 1: Demonstrate command and control of Haz-Mat personnel and activities.

STRENGTH

- ACHMT staged at parking lot near Pine Log / Silverbluff Road for safe-area accountability and to determine number of responders available. Staging hazmat at Kroger negated the need to provide specific entry routes to responders unfamiliar with the Graniteville area.

IMPROVEMENT ITEM

- LEL (lower explosive limit) and standard O₂ levels monitored by ACHMT, indicating crash scene impact only. Chlorine could have been indicated with proper monitoring equipment.
- ACHMT was not effectively integrated into haz-mat operations.
- Decon areas were not monitored due to no haz-mat support at decon locations.

OBJECTIVE 5: STAFF & ACTIVATE

Activate emergency response facilities in an effective and timely manner based on the type and extent of emergency.

Criteria 1: Activated emergency response members report and perform their assigned duties.

STRENGTH

- Aiken County GIS personnel responded to the EOC after seeing news report. A GIS position will be established for future EOC activations.
- ACSO Dispatch was requested to contact EOC personnel, but individual calls were also made by ACEMD staff to ensure response members were contacted.

IMPROVEMENT ITEM

- Responding EOC staff was not provided specific routes of travel. ACEMD should consider adding safe route determination to EOC procedures.
- Pre-event coordination of consistent GIS data needed.
- All ACEMS personnel do not have County issued pagers. No process in place for call-back other than landline which resulted in approximately 25% response.

OBJECTIVE 6: PUBLIC INFORMATION

Develop and disseminate accurate and timely information to the news media and the public.

Criteria 1: Inform state and county elected officials, local and national news agencies of the event, and disseminate accurate information and instructions to the public.

IMPROVEMENT ITEM

- EOC did not have press releases prior to distribution at CP. Hard copies of press releases were not initially distributed at press conferences.
- Unmanned radio stations limited ability for local alerts to be made.
- Initial notification did not go out through NOAA Weather Radio, although it was utilized later in the day.
- EOC PIO could not get response from PIOs at CP to coordinate message for media at EOC.
- Citizens in shelters had no official information source.

Criteria 2: Demonstrate effective communications.

STRENGTH

- Salvation Army provided interpreters for Hispanic population.

IMPROVEMENT ITEM

- 211 (Aiken County Help Line) received calls immediately but had no info to provide initially. 211 received updated information via television news report. As a result, 211 personnel did not learn key information such as the shelter in place message that had been transmitted to residents.
- 211 is not accessible via cell phone. Additional number needs to be provided.
- EOC was receiving updated information via television news reports.
- Media staging area was located too close to CP.

OBJECTIVE 7: MEDICAL

Demonstrate the ability to provide appropriate medical care for injured personnel.

Criteria 1: First responders provide proper first aid care for injured personnel.

STRENGTH

- ACEMS utilized PPE from Aiken County COBRA team which allowed EMS personnel to re-enter scene for rapid rescue.

Criteria 2: Demonstrate command and control of the medical emergency.

IMPROVEMENT ITEM

- ACEMS attempted to medical monitor other responders, but they were entering incident area without EMS coordination.
- Triage tags were not utilized, although they were available.

- The on-duty EMS supervisor must relinquish control of outside incidents and focus on major incident being responded to.

Criteria 3: EMS personnel provide proper emergency medical care for injured and/or contaminated personnel.

STRENGTH

- ACEMS supported three separate decon sites with medical monitoring.
- Due to overwhelming number of calls for assistance being received from Graniteville area, decision was made to enter with Level-B suits by haz-mat technician-level EMS personnel.
- Decision to not transport patients prior to decon was made by ACEMS Shift Supervisor.

IMPROVEMENT ITEM

- EMS entry into the hot zone was coordinated thru ACSO Dispatch who contacted the EMS supervisor at USCA. No coordination with GVWFD.

Criteria 4: Demonstrate effective communications.

STRENGTH

- Local Hospitals were contacted early on by EMS supervisor informing them of patient potential.

IMPROVEMENT ITEM

- Mass casualty plan not implemented initially due to communications difficulties.
- Communication of patient status at decon was not well-coordinated with Red Cross shelter representatives. Persons at shelters were registered, but if they were sent to the hospital or left with friends/family, their status was unknown.

OBJECTIVE 8: RECOVERY

Perform recovery activities.

Criteria 1: Develop a recovery plan outline that identifies appropriate recovery strategies.

STRENGTH

- EPA led recovery effort to re-open schools and area businesses. Coordination occurred through UCP. A school rep was onsite for all entries.
- County finance office implemented hour code to assist in tracking costs.

IMPROVEMENT ITEM

- Not all agencies attended Critical Incident Stress Debriefings (CISD). This needs to be added to recovery plan checklist.
- EOC had some difficulty obtaining some resources due to weekend hours. Commercial disaster recovery resource books may be useful in the EOC, as well as emergency contacts for local suppliers.
- County Damage Assessment official initially left out of planning loop for reentry.
- All support agencies (Salvation Army, Red Cross, DSS, etc.) were not kept informed of recovery status. Although daily status meetings were held at the UCP, the information was not communicated with the EOC.

OBJECTIVE 9: FACILITIES AND EQUIPMENT

Demonstrate the adequacy and functionality of facilities and equipment to support emergency operations.

Criteria 1: Facilities and equipment are adequate, functional and safe to operate.

STRENGTH

- SC Department of Social Services called in individuals to staff shelter at USCA campus which had not been previously designated in planning.

IMPROVEMENT ITEM

- Generator noise made it difficult to communicate at or with the CP. Electric capabilities earlier on would have helped.

- Ladders were available for phone setup in EOC but due to the chaos, people were standing on chairs to connect the lines.
- There was difficulty in obtaining contacts for telephone installation, however once SCEMD became involved it went smoothly. Procedure is now in place to obtain phones in emergency situations.

Criteria 2: EOC/ICP/UC maintains appropriate technological equipment to maintain effective communication with Federal/state and local agencies.

IMPROVEMENT ITEM

- Field charging capabilities are needed for portable radios and cell phones. Mobile Command Center is obtaining additional radios/batteries.
- Web EOC communication and tracking system was not utilized due to time consuming effort to set up basic needs in EOC.
- Lack of copiers at CP significantly hindered information distribution.
- GIS map plotters being used were 1 mile away at County planning office. Portable plotter capabilities need to be addressed.
- EOC printing capabilities were limited.

LESSONS LEARNED

- Joint training between EOC personnel and CP responders is needed. Agencies need to understand each other's roles and capabilities.
- Hurricane responders are excellent at communicating during crises, and may be a good benchmark.
- SCEMD is developing the concept of a County EOC team (comprised of multiple county EP personnel) as well as an "Incident Response Support Team" to assist CP personnel with various activities (facility needs, communication needs, etc.).
- Reverse 911 may be useful for personnel recall (pre-designated call groups) and training on the Reverse 911 process is needed.
- 211 being added to phone priority list should be considered. Lessons Learned from other 211s is that some local governments release non-essential personnel to support 211 calls during times of crisis.
- EOC PIO suggests meetings with local agency PIOs to discuss lessons learned and preparedness for future incidents.

The following agencies and departments participated in the Aiken County Government after action review and contributed to the information contained in this report.

Aiken County Emergency Services Department

Aiken County Emergency Management Division

Aiken County Emergency Medical Services

Aiken County Hazardous Materials Team

Aiken County Administrator's Office

Aiken County Planning and Development

Aiken County Information Technology Department

Aiken County Public Works and Engineering

Aiken County Finance Department

Aiken County Department of Social Services

Aiken County Help Line / 2-1-1

Aiken County Public Schools

American Red Cross

The Salvation Army

South Carolina Emergency Management Division

South Carolina Department of Health and Environmental Control

US Environmental Protection Agency

9.7 Appendix 7 – Aiken County Sheriff's Office After-Action Report

**Aiken County Sheriff's Office
After-Action Report**

**Graniteville Train Wreck
January 2005**



Aiken County Sheriff's Office
After-action report
Graniteville Train Wreck—January 2005

Summary

On January 6, 2005 at approximately 02:45, two Norfolk Southern freight trains collided in Graniteville, South Carolina. The collision resulted in a catastrophic release of chlorine gas to the atmosphere from a tank car damaged in the derailment. This release rapidly vaporized to form a dense and highly toxic airborne cloud affecting Graniteville residents and employees of nearby Avondale Mill. Other hazardous materials cars involved in the derailment included 2 additional chlorine cars, 1 sodium hydroxide car and 1 creosol car.

More than 500 people sought medical evaluation, approximately 70 people were admitted to hospital and 9 people were killed due to chlorine exposure.

Initial responding agencies from Aiken County included the Graniteville-Vaucluse-Warrenton (GVW) Fire Department, Aiken County Emergency Medical Services (ACEMS), Aiken County Sheriff's Office (ACSO), Aiken Department of Public Safety (ADPS) and Aiken County Emergency Management Division (ACEMD). Approximately 600 Federal, state and local personnel participated in the response to this disaster.

This report will focus primarily on the actions and observations of the Aiken County agencies involved in the initial response.

Strengths and Improvement Items will be identified to document the Aiken County Sheriff's Office ability to recognize, respond to, and control a hazardous materials emergency, as well as to coordinate an integrated response that will protect the health and safety of emergency response personnel, the general public and the environment.

Strengths are those areas in which responders demonstrated exceptional ability or knowledge, or other areas of programmatic solidity. Improvement Items are deviations or concerns regarding a particular issue. An improvement item, by itself, does not degrade the response, but the emergency response may be more effective if alternative measures were implemented. Strengths and Improvements Items will be identified utilizing objectives that are applicable to the agency's response authority.

**Aiken County Sheriff's Office
After-action report
Graniteville Train Wreck—January 2005**

OBJECTIVE 1: SAFETY

Demonstrate the ability for agency personnel to perform response activities safely.

Criteria 1: Emergency response agency member perform response activities safely.

STRENGTH

- ACSO personnel had Personal Protective Equipment (PPE) in their vehicles and were directed to utilize it.
- ACSO Sheriff contacted neighboring county Sheriff's directly via cell phone to coordinate safe arrival direction to staging area.
- ADPS Staging officer directed rescue personnel through specified safe routes.
- OSHA representative offered support on Day 2 and identified no safety concerns for responders.

IMPROVEMENT ITEM

- Habitability surveys were not conducted initially at Command Post or Forward Operations.

Criteria 2: Effective scene safety operations through appointment of Safety Officer position reporting to Incident Commander (IC).

IMPROVEMENT ITEM

- Safety Officer was not initially assigned for the incident however one was appointed when Command Post (CP) relocated to Kmart parking lot.

OBJECTIVE 2: PROTECTIVE ACTIONS

Demonstrate the ability to develop and implement appropriate protective actions.

Criteria 1: Determine/implement protective actions for the area.

STRENGTH

- Access controlled early through traffic control points established quickly and efficiently due to recent training. Locations determined based on major intersections and information received from 911 distress calls within first 15 minutes. Roadblock placement reevaluate within first 30 minutes, and determined to be adequate based on wind direction and hazmat input.

Aiken County Sheriff's Office
After-action report
Graniteville Train Wreck—January 2005

- ACSO/GVW FD / ACEMD agreed to recommend shelter in place through utilizing Reverse 911.
- Air monitoring at checkpoints discussed at 03:00 Command Post meeting.

IMPROVEMENT ITEM

- Reverse 911 was not activated in a timely manner due to access available only by Emergency Management personnel. This weakness has been corrected so that Reverse 911 can not be activated through direction from Dispatch supervisor or authorization of Incident Commander.

Criteria 2: Perform personnel accountability.

STRENGTH

- ACSO shift supervisor performed running roll call for those on-duty.
- Personnel were ordered to go to staging (per their Incident Command System training) and reported to Aiken Department of Public Safety for accountability.
- ACSO appointed Staging officer to coordinate incoming law enforcement resources.
- To aid in accountability efforts, an employee roster was developed by plant supervision

IMPROVEMENT ITEM

- No formal accountability procedure was utilized however handwritten logs were maintained as a result of previous training.
- Staging checklist would be helpful if individual who normally fills position is unavailable.

Criteria 3: Isolate incident scene/area and plume path.

STRENGTH

- Personnel initially isolated the incident scene and surrounding area through conservative estimation by the ACSO shift supervisor.
- DOT Emergency Response Guide used to determine 1.5 miles radius as initial protective isolation distance. Electronic version to be added to CP laptops.

**Aiken County Sheriff's Office
After-action report
Graniteville Train Wreck—January 2005**

Criteria 4: Demonstrate effective communications.

STRENGTH

- Key representatives of fire, law enforcement and emergency services at Command Post actively discussed evacuation versus shelter in place.

OBJECTIVE 3: MITIGATION

Demonstrate the ability to properly mitigate, stabilize conditions and gain control over the emergency situation.

Criteria 1: The emergency response agency mitigated the emergency effectively.

STRENGTH

- Evacuees were aided by ADPS and ACSO on Aiken/Augusta Highway and other traffic control points.
- Due to scope of event, continuity of daily operations was identified as an issue to be addressed in planning.
- Decontamination stations set up early at multiple locations outside of hazard area.
- Federal Homeland Security assets requested to supplement rapidly exhausting resources.
- GIS relationships previously utilized to aid criminal investigations and fire response resulted in early use of maps.
- Evacuation for 1-mile based on information obtained early on (grid maps, etc); populations had already been determined through GIS data.
- School closures were planned at 03:00 meeting.
- Plan developed for safe shutdown of Avondale Mill plant operations.
- ADPS utilized at hospital to conduct triage, treatment and security.

Criteria 2: The county EOC provides adequate support to assist in mitigating the incident.

STRENGTH

- County GIS personnel supported operations through continuous production of maps that were distributed to all agencies.
- EOC staff worked to procure buses for initial evacuation and for transport from decontamination sites to hospital.
- Salvation Army/Red Cross response implemented through plans developed by Emergency Management staff.

Aiken County Sheriff's Office
After-action report
Graniteville Train Wreck—January 2005

IMPROVEMENT ITEM

- Credibility of EOC hampered by lack of a dedicated, adequate facility.
- EOC staff not available until approximately 09:00-10:00 due to set-up and activation. Many issues the EOC could have helped with were handled at staging.

Criteria 3: Demonstrate effective communications.

STRENGTH

- 800mz radios were brought in to make sure a common radio frequency was utilized among agencies. Because of familiarity with State and Homeland Security assets this request was initiated early on.
- Aiken County communications center dedicated one channel for fire units operating at the Graniteville incident.
- IC had constant communications with Hazmat, EPA and DHEC personnel.

IMPROVEMENT ITEM

- Initial incident information was not adequately shared among responding agencies due to incompatible radio frequencies. This issue being addressed through acquisition of 800 MHZ radios for responding agencies command staff. Radios are being obtained through Homeland Security funding.

Criteria 4: Demonstrate Command and Control

STRENGTH

- The Incident Command System and key positions were implemented early in response.
- Routine briefings were conducted for participating agencies.
- When Sheriff left the CP, command was formally transferred to other ACSO staff.

IMPROVEMENT ITEM

- Key agency representatives responding to the CP should be clearly identified and remain in the CP throughout the incident to support the IC.

**Aiken County Sheriff's Office
After-action report
Graniteville Train Wreck—January 2005**

Criteria 5: Agencies effectively integrate additional support into UC/EOC operations.

STRENGTH

- Additional emergency response agencies reported to Staging and sought out Sheriff for briefing. Agencies were logged in and a directory of contacts was developed.
- Private contractors were staging apart from the responder's staging area.
- Hazmat entry team provided video at first light; SLED helicopters utilized for search and rescue and for scene status.
- Federal/state response agencies integrated into Unified Command and participating in briefings.

Criteria 6: Law enforcement personnel mitigate the security crisis effectively.

STRENGTH

- ACSO SWAT team activated per pre-developed plan, to address possible additional terrorist events at critical infrastructure locations in county.
- Due to possible hostile incidents indicators, State Homeland Security resources activated by Sheriff upon receipt of initial call, bringing the SC Law Enforcement Division (SLED) on board.
- FBI responded quickly due to pre-established relationship.
- Current Mutual Aid Agreements in place for additional response agencies.
- Curfew implementation was discussed in the early morning and planned. Council Chairman signed a county ordinance to give Sheriff the authority to impose curfew prior to Governor declaring State of Emergency. Sheriff was in contact with Governor's Office and the Attorney General's office to coordinate declaration of State of Emergency. Attorney General arrived at the scene to discuss legal ramifications of declaration.

Criteria 7: Appropriate actions are taken to protect and account for emergency responders at the scene.

STRENGTH

- Rescue, curfew and evacuation operations were initially planned for a 7 day period. Issues identified and addressed include: food / hydration / shelter / sanitation barricades / shift rotation.
- ADPS and SCSO provided hurricane stock of bottled water for responders.

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IMPROVEMENT ITEM

- Accountability system (hazmat wristbands) implemented by Fire Department was not communicated to all responding agencies.
- Coroner had to PPE for entering hazmat zone. This issue being addressed through acquisition of PPE through Homeland Security funding.
- Accountability badge system needs to be developed for private vendors that respond to incident with no official identification.

OBJECTIVE 4: STAFF & ACTIVATE

Activate emergency response facilitate in an effective and timely manner based on the type and extent of emergency.

Criteria 1: Activated emergency response members report and perform their assigned duties.

STRENGTH

- Dispatch conducted recall by alpha-numeric pager (All-Call) to respond to Staging.
- Initial Command Post (CP) was at Honda Cars of Aiken for 30-45 minutes before being relocated to Kmart. CP setup was conducted through the on-call Communications Officer from the procedure in place.

Criteria 2: Demonstrate effective communications.

STRENGTH

- Briefings were conducted at least 6 times daily with formal 2-hour notice; more often if needed. All response agencies were informed of briefing times.
- Uninterrupted dispatch communications at the CP accomplished by mobile communication vehicle and aided response communications.
- Hard phone lines were run to the CP by noon on Day 1.

Criteria 3: Law enforcement personnel staff and activate properly to maintain security of facilities.

STRENGTH

- Initial Access controls were put in place via cones/tape/patrol officers.
- Day 3, decision makers moved to the antique mall and restricted access through 24-hour security procedures that were implemented.

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OBJECTIVE 5: PUBLIC INFORMATION

Develop and disseminate accurate and timely information to the news media and the public.

Criteria 1: Issue accurate news releases in a timely manner.

STRENGTH

- Initial news release was issued within an hour of the event and contained accurate information.
- Briefings were scheduled to accommodate newspaper/radio/television deadlines.

Criteria 2: Inform state and county elected officials, local and national news agencies of the event, and disseminate accurate information and instructions to the public.

STRENGTH

- Community meetings were conducted to provide info on housing, food, and progress of cleanup operations. Mental health agencies were present at these meetings. Issues included pets and reentry concerns.
- Rumor control—211 information line was coordinated by the EOC; rumors were also addressed during news briefings.

Criteria 3: Demonstrate effective communications.

STRENGTH

- Spanish interpreter used to provide emergency information to public.
- EPA and SCDHEC produced flyers for citizens with information regarding housekeeping and food handling upon return to homes.
- Public Service Announcements were produced and broadcast regarding housekeeping and food handling upon return to homes.
- Quarterly media relations meetings conducted by local law enforcements to develop pre-crisis relationships resulted in effective communications.

Criteria 4: Demonstrate command and control.

STRENGTH

- ACSO Public Information Officer (PIO) coordinated media through implementation of a media staging area that was clearly identified to media.

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IMPROVEMENT ITEM

- Responding agencies should pre-identify a PIO and participate in Joint Information Center (JIC) briefings.

OBJECTIVE 6: RECOVERY

Perform recovery activities.

Criteria 1: Develop a recovery plan outline that identifies appropriate recovery strategies.

STRENGTH

- Law enforcement met with fire, school reps, EPA and DHEC on school re-openings. Requested visible DHEC/SLED/FBI support on re-opening days. Open house conducted day prior to re-opening.
- Maps were updated in reverse showing reduction in impacted areas.
- Reentry was coordinated with DHEC/EPA and companies contracted to perform cleanup.
- Detailed discussion conducted with cleanup contractor regarding re-opening of roadways and possible to equipment located on Aiken/Augusta Highway.
- Meetings were held to discuss financial implications of plant shutdown and other issues of affected businesses and utilities (meeting payroll, phone communications, etc.).

IMPROVEMENT ITEM

- Recovery plan not formally documented in a written plan.
- Reimbursement needs should be included in recovery plan (supplies, hours, equipment, etc.).
- Utilization of business cards of other "quick reference" needed to assist in identifying major players involved in recovery planning.
- Recovery plan should include animal control/consideration of animal welfare.

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OBJECTIVE 7: FACILITIES AND EQUIPMENT

Demonstrate the adequacy and functionality of facilities and equipment to support emergency operations.

Criteria 1: Facilities and equipment are adequate, functional and safe to operate.

STRENGTH

- Command staff made arrangements to utilize nearby vacant building for Unified Command operations.

IMPROVEMENT ITEM

- Arrangements need to be made for copy machines/printers/pin boards/grease pencil boards/current maps.
- Early identification needed to resolve issues with generator smell and noise at CP/UCP
- Pre-determined arrangements should be made for potential fuel needs during disasters. This issue has been addressed and agreements have been secured to meet this need.
- Consideration should be given to developing capability of mobile mapping and GIS capabilities.
- UCP setup should include rapid setup of Internet capabilities for more effective communications and data sharing between responding agencies.

9.8 Appendix 8 – GVW Fire Department After-Action Report

**Graniteville-Vaucluse-
Warrenville Fire Department
After-Action Report**

**Graniteville Train Wreck
January 2005**



Graniteville-Vaucluse-Warrenville (GVW) Fire Department
After-action report
Graniteville Train Wreck—January 2005

Summary

On January 6, 2005 at approximately 02:45, two Norfolk Southern freight trains collided in Graniteville, South Carolina. The collision resulted in a catastrophic release of chlorine gas to the atmosphere from a tank car damaged in the derailment. This releases rapidly vaporized to form a dense and highly toxic airborne cloud affecting Graniteville residents and employees of nearby Avondale Mill. Other hazardous materials cars involved in the derailment included 2 additional chlorine cars, 1 sodium hydroxide car, and 1 creosol car.

More than 500 people sought medical evaluation, approximately 70 people were admitted to hospitals and 9 people were killed due to chlorine exposure.

Initial responding agencies from Aiken County included the Graniteville-Vaucluse-Warrenville (GVW) Fire Department, Aiken County Emergency Medical Services (ACEMS), Aiken County Sheriff's Office (ACSO), Aiken Department of Public Safety (ADPS) and Aiken County Emergency Management Division (ACEMD). Approximately 600 Federal, state and local personnel participated in the response to this disaster.

This report will focus primarily on the actions and observations of the Aiken County agencies involved in the initial response.

Strengths and improvements items will be identified to document the Graniteville-Vaucluse-Warrenville (GVW) Fire Department's ability to recognize, respond to, and control a hazardous materials emergency, as well as to coordinate an integrated response that will protect the health and safety of emergency response personnel, the general public and the environment.

Strengths are those areas in which responders demonstrated exceptional ability or knowledge, or other areas of programmatic solidity. Improvement items are deviations or concerns regarding a particular issue. An improvement item, by itself, does not degrade the response, but the emergency response may be more effective if alternative measures were implemented. Strengths and improvement items will be identified utilizing objectives that are applicable to the agency's response authority.

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OBJECTIVE 1: SAFETY

Demonstrate the ability for agency personnel to perform response activities safely.

Criteria 1: Emergency response agency members perform response activities safely.

STRENGTH

- GVW personnel provided specific directions to responders reporting to the Command Post (CP)

Criteria 2: Demonstrate effective scene safety operations through appointment of safety officer position reporting to IC.

STRENGTH

- Safety Officer appointed at CP per pre-established dept policy.

OBJECTIVE 2: PROTECTIVE ACTIONS

Demonstrate the ability to develop and implement appropriate protective actions.

Criteria 1: Determine/implement protective actions and isolate incident scene/area.

STRENGTH

- Response personnel were instructed to clear the area by GVW Fire Chief upon realization of imminent danger.
- Access/egress zones implemented through quick establishment of roadblocks.
- Immediate area evacuated (300 yards)/shelter in place for within 1 mile radius; roadblocks placed Roadblocks established in a timely manner;
- Savannah River Site provided periodic weather updated for Protective Action consideration

IMPROVEMENT ITEM

- Reverse 911 was not achieved in a timely manner due to access available only by Emergency Management personnel. This weakness has been corrected so that Reverse 911 can now be activated through direction from Dispatch supervisor or authorization of Incident Commander.

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OBJECTIVE 3: MITIGATION

Demonstrate the ability to properly mitigate, stabilize conditions and gain control over the emergency situation.

Criteria 1: The emergency response agency mitigates the emergency effectively.

STRENGTH

- Responders were thoroughly debriefed when they returned to the CP from operations in the hot zone.
- Logistical support was timely in processing requests once they were established. Additional maps were available at the CP within thirty minutes.
- Railroad consist received at the CP within the first hour.
- Written preplans were used for searches of mill facilities. GVW FD walks down all Avondale facilities annually.

IMPROVEMENT ITEM

- GVW FD did not have adequate resources to conduct decon activities for mass casualty situation.

Criteria: 2: The county EOC provides adequate support to assist in mitigating the incident.

STRENGTH

- Logistical support was timely in processing requests once EOC was established.

IMPROVEMENT ITEM

- Activation and full operation of the EOC was a slow process due to early hour and lack of dedicated facility.

Criteria: 3: Demonstrate effective communications.

- Internal FD communications were successful. Nextel was used as backup communications for privacy of command staff conversations.
- Primary FD communications occurred via E-Tower which was restricted to GVW FD use.
- Dispatcher initiated all-call page for other county Fire Departments to be on standby.
- State of SC provided additional communications capabilities through 800 MHz radio.
- Faxes, phones, etc. available on hazmat units was a key factor in good communications.

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- Twice a day briefings with written objectives were conducted at UCP; status of previously established objectives were updated at each briefing

IMPROVEMENT ITEM

- Dispatch should provide more detailed information on location of victims requesting assistance.
- Dispatch should coordinate received information between positions for distribution to all agencies.

Criteria: 4: Demonstrate Command and Control.

STRENGTH

- Recorder position for FD implemented upon activation of the UCP.
- Asst Chief/chief was available on the scene throughout the event.

IMPROVEMENT ITEM

- FD should establish recorder position to assist and document IC activities. Court recorders were provided but not coordinated with IC.
- No coordination between FD and EMS during initial incident response.
- Incident Command System (ICS) process not followed by all responding agencies.

Criteria: 5: Agencies effectively integrate additional support into UC/EOC operations.

STRENGTH

- SC Firefighter Mobilization plan activated and well-staffed.
- Unified Command provided access to all needed agencies. Federal agencies well-integrated and supportive, EPA continually provided maps once the Unified Command Post (UCP) was established.
- Mutual aid agreements in place with SRS and Aiken County.
- Fort Gordon haz-mat resources were briefed to GVW FD approximately 6 weeks prior to incident through a Fort Gordon community support training activity.
-

IMPROVEMENT ITEM

- Formal mutual aid agreement needed with Richmond County.
- GVW FD personnel need to be briefed on County Emergency Operations plans/procedures.
- Entry teams from other agencies not coordinated with FDIC during early hours of incident.
- Buses used for transport of evacuees were not coordinated with FDIC.
- Better integration of law enforcement and EMS personnel into FD ICS.

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Criteria: 7: Appropriate actions are taken to protect and account for emergency responders at the scene.

STRENGTH

- CP relocated due to wind direction considerations (flag provided visual confirmation of wind direction).
- Initial responders notified subsequent responders of danger involved.

IMPROVEMENT ITEM

- Initial FD accountability weak for first 30 minutes due to response from multiple locations; control was regained through radio roll call and telephones.
- Lack of credentials caused some problems with movement of volunteer responders; County produced generic badges with names but no photos.

OBJECTIVE 4: CHEMICAL MONITORING

Demonstrate the ability to minimize exposure and control chemical conditions.

Criteria: 3: Demonstrate command and control of Haz-Mat personnel and activities.

STRENGTH

- Habitability surveys conducted at CP upon arrival of hazmat team. EPA conducted surveys at CP upon their arrival.
- SRS and Richmond County haz-mat resources arrived on scene within a timely manner and were designated by FDIC to be responsible for hazmat operations.
- Hazmat personnel assisted in CP location determination.
- EPA utilized Coast Guard Gulf Coast Strike Team to provide monitoring and on scene response.
- By comparing consist to entry team visual inspection chemicals involved were accurately identified a Written response plan and safety procedures implemented for hazmat operations.
- Briefings provided to hazmat responders by Safety Officer on entry considerations; maps were covered for responders unfamiliar with the area.

Criteria: 4: Demonstrate effective communications.

STRENGTH

- SRS and Richmond County hazmat personnel were familiar with Aiken County personnel and integrated fearlessly into FD operations.
- During UCP meetings, CTEH scientist explained plume models in such a manner that everyone was comfortable.

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Criteria: 6: Demonstrate the ability to handle contaminated, non-injured personnel appropriately.

STRENGTH

- Ascauga Lake/Bettis Academy Rd. decon unit established and vital signs recorded.
- Multiple decon centers established on perimeter of affected area.

IMPROVEMENT ITEM

- Decon logs were not accurate due to chaotic state at the scene
- Gross decon performed but quickly overwhelmed; FD did not have adequate resources to conduct decon activities for mass casualty situation.

OBJECTIVE 4: STAFF & ACTIVATE

Activate emergency response facilities in an effective and timely manner based on the type and extent of emergency.

Criteria 1: Activated emergency response members report and perform their assigned duties.

STRENGTH

- Dispatcher initiated all call page for other FDS to be on standby w/o consulting IC.
- Specific directions were provided to responders reporting to the CP
- Community support to provide facilities (Honda Cars/Johnson Motors, Baptist Church) was very beneficial to command and response operations.

OBJECTIVE 6: MEDICAL

Demonstrate the ability to provide appropriate medical care for injured personnel.

Criteria: 1: First responders provide proper first aid care for injured personnel.

STRENGTH

- Initial evacuees treated and vital signs monitored at decon check points established by FD; Additional treatment station established at GVW FD Station 2.
- Medical communications regarding signs/symptoms clear and accurate.
- Hazmat/EMT/First Responder training conducted by GVW FD now includes discussion of appropriate actions to this event.

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IMPROVEMENT ITEM

- Development of checklists for mass casualty incidents to record patient information.

Criteria: 2: Demonstrate command and control of the medical emergency.

IMPROVEMENT ITEM

- There was no coordination between FD and EMS during initial event response; effective coordination between FD and EMS occurred several hours into incident.

OBJECTIVE 5: PUBLIC INFORMATION

Develop and disseminate accurate and timely information to the news media and the public.

Criteria 1: Conduct effective news conferences.

IMPROVEMENT ITEM

- GVW FD should establish PIO position for adequate representation at joint press conferences. This would allow for better coordination between ACSO and the FDIC.

OBJECTIVE 6: RECOVERY

Perform recovery activities.

Criteria 1: Develop a recovery plan outline that identifies appropriate recovery strategies.

STRENGTH

- Good coordination with Avondale plant officials in developing recovery plans.
- GVW representative attended daily NTSB briefings.

IMPROVEMENT ITEM

- Development of a recovery checklist may be beneficial for future incidents to address issues such as CIS debriefings, vehicle recovery, and temporary department facilities.
- Designated individual should be identified to coordinate donations and spontaneous volunteers.

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PATH FORWARD

- The Graniteville-Vaucluse-Warrenville Fire Department has produced this document in the hopes that other emergency response organizations can benefit from the lessons learned in this incident.
- The Graniteville-Vaucluse-Warrenville Fire Department believes that multiple agency response drills would be beneficial to future responses.
- The Graniteville-Vaucluse-Warrenville Fire Department would like to participate in a roundtable session with other agencies that responded to this incident in an effort to discuss the lessons learned and to strengthen cooperation among agencies.

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