

**EMERGENCY RESPONSE CAPACITY TO HIGH-LEVEL NUCLEAR WASTE  
AND HAZARDOUS MATERIALS TRANSPORTATION INCIDENTS  
IN ESMERALDA COUNTY**

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## EXECUTIVE SUMMARY

This study was conducted for the Esmeralda County Repository Oversight Program Office, and focuses on the emergency response to the munitions truck explosion of November 21, 1990 on U.S. 95. Using the munitions truck emergency response by Esmeralda County as an example, along with other data on the emergency response capacity of the County, an analysis of the ability of the County to respond to both hazardous materials and radioactive emergency incidents is provided. The report is divided into four sections.

Section One details the emergency incident and the subsequent response by Esmeralda County and other entities emergency service personnel. The analysis of the response determined that Esmeralda County emergency service personnel, largely volunteers or part-time employees responded in an exemplary manner. Yet several major problems arose in responding to the incident, which under different circumstances might have resulted in major loss of life or property. These problems involved the lack of cooperation by the military to respond to the incident or even identify the cargo; the lack of training among Esmeralda County emergency response personnel to adequately deal with HAZMAT incidents, coordination and communication problems among County, State, and Federal agencies which had response responsibilities, the severe lack of adequate equipment among Esmeralda County responders to manage or control HAZMAT incidents. In short, Esmeralda County, like most rural Nevada counties, does not have the capacity to meet any major hazardous materials incident, especially one involving high-level radioactive waste.

Section Two of the report examines the nature of the transportation risk in Esmeralda County. The analysis performed, which underestimates the volume of hazardous materials shipments through the County because of the lack of availability of data on DOD and DOE shipments, indicates that an average of 6,205 hazardous materials shipments annually will travel through Esmeralda County on two segments of U.S. 95. In addition, almost 5,000 trucks annually can be expected to pass through Goldfield carrying hazardous materials on U.S. 95. Not only are accidents involving trucks increasing, but the Goldfield Curve is a "critical curve" which possesses many dangerous characteristics for hazardous materials shipments. Indeed, current mitigation efforts do not seem to have effectively reduced the degree of risk of this curve or the number of accidents. If the Yucca Mountain Repository becomes a reality and U.S. 95 is a major transport route for shipments, the Goldfield Curve will be a very high risk for accidents.

Section Three analyzes the emergency management capacity of Esmeralda County, focusing on the question of whether the emergency response resources are capable of preventing, responding, and mitigating a serious hazardous materials incident. The analysis identifies eight major deficiencies which include the lack of adequate funding to hire sufficient staff to complete new and revise existing plans, to the lack of adequate training of personnel in hazardous materials response. In addition, there is a lack of adequate equipment for fire and emergency medical services, and the County Sheriff's Department and the local Director of Emergency

Management also lacks training and adequate equipment. Intergovernmental aid from the State and the military has been inadequate and often not coordinated. Finally, despite the enormous effort by several individuals and general good fortune, Esmeralda County lacks the resources, planning and equipment that would enable it to respond, even at a basic level, to a serious hazardous materials emergency.

The final section of the report examines the impact that the Yucca Mountain Repository would have on emergency services in Esmeralda County, and provides both short-term and long-term recommendations for improvement of emergency services. Shipments of radioactive materials through Esmeralda County are increasing, probably headed to Beatty. Esmeralda County is not prepared with regard to either equipment or training to respond to radioactive incidents. In addition, the current emergency operations center is inadequate, as are current communication systems. Current Emergency Management Plans are in need of revision, and all emergency service personnel would require additional training. The County response to even hazardous materials incidents at this time seem limited to largely establishing control in an area away from the incident's location, and to wait for outside help. This role is totally inadequate now and the siting of the Repository would only make current inadequacies more visible. Both the short-term and long-term recommendations are presented here, as well as in the body of the text.

#### Short-Term Recommendations

1. The Director of Emergency Management for Esmeralda County should be a full-time position. It is unrealistic to believe that emergency management plans can be revised and written, along with the other responsibilities of this position, by a part-time employee.
2. Additional training of all emergency service personnel is of paramount importance. EMS, fire, sheriffs, and other personnel who are not only responders but also involved in mitigation, planning and preparedness, and recovery phases of emergency management require additional training. The nature of the risk and the volume of the hazardous materials being transported require more local expertise than is currently available. Mere identification of loads through familiarity with placards does not constitute response. Yet, even additional training would not be effective unless responders are provided with the necessary equipment.
3. The most pressing equipment needs involve a hazardous materials van that is properly equipped. Several times in this report, it has been suggested that some combination of four rural counties (Esmeralda, Nye, Mineral, and Lyon) explore the possibility of developing this capability. It is strongly suggested that state and federal aid be sought for both this equipment and the additional training which will be necessary. The request for this aid from the federal and state sources is easily justified because much of the risk is a function of the presence of Federal facilities where shipments emanate from or are the final destination point. The State already had a permitting system for intrastate shipments of hazardous materials, and various sources of funds. While out of the scope

of this study, we suspect that other rural counties in Nevada are in a similar situation regarding the lack of sufficient equipment and training to effectively respond to hazardous materials incidents.

4. Meetings should be held with the appropriate federal agencies and representatives of the military, and steps taken to ensure a coordinated and timely response to any similar event in the future.
5. Actions should be taken to provide all emergency service personnel with hand-held radios, or an alternative communication means which permits all parties to communicate directly with each other. Until the State has taken the necessary action to resolve the communication maze that exists within Nevada among emergency responders, it is incumbent on local entities to ensure adequate communication among their own personnel.
6. The state of current planning has been found to be inadequate; partially the result of inadequate resources. These Emergency Management and Hazardous Materials Plans should be completed and thoroughly exercised as quickly as possible.
7. Formal Mutual Aid Agreements with neighboring counties should be entered into to ensure that any response that is necessitated will at least be joined into by other jurisdictions.
8. Training needs should be identified and prioritized with the aid of the County Training Officer. A training schedule should be constructed reflecting these priorities and actions taken to guarantee its successful implementation.
9. Plan annexes, especially evacuation, should be adequately exercised and corrected. All emergency response personnel should receive additional training to eliminate the possibility that the types of errors found present in the munitions truck explosion are repeated in the future.
10. Efforts should be started to upgrade the hospital facilities in Tonopah to allow it to treat contaminated patients. This recommendation follows from the development of the Hazardous Materials Team and Van. Some decontamination capability is essential along U.S. 95, a major transportation route for hazardous materials.
11. Additional full-time personnel are needed in the other areas of emergency response. While we realize it is unrealistic to expect Esmeralda County to develop a full-time fire department, or emergency medical service department, at least one full-time person should be employed in each of these areas, and appropriate training provided.
12. Emergency service personnel should be consulted immediately to determine exactly what their equipment needs are for hazardous materials response. Their recommendations

should be shared with State and Federal authorities, and aid from these entities sought. While Esmeralda County is not in good fiscal condition, those entities who are either responsible for increasing the risk of a hazardous materials accident in the County which jeopardizes the well-being of its citizens, or those entities which have legal responsibility for the health and welfare of the citizenry need to be petitioned for aid. There is little equity currently, when Esmeralda County citizens because of a U.S. transportation route are exposed to a high degree of risk to such accidents. It is the responsibility of higher jurisdictions to aid in the correction of this condition.

13. The Department of Motor Vehicles and the Nevada Highway Patrol should be consulted to determine if they are willing to share tracking information on carriers of hazardous materials. This information is required on all within-state shipments and includes destinations and load information. Access to this system would provide Esmeralda County emergency response personnel, including the County Sheriff, vital information for both mitigation and response functions.

#### Long-Term Recommendations: The Yucca Mountain Repository

In addition to the short-term recommendations listed above, if the Yucca Mountain Repository is built these additional recommendations would also apply.

1. Increased training for all emergency response personnel in radioactive materials response.
2. County sheriffs, in particular, and other emergency service personnel should be provided with dosimeters and survey meters. Training with this equipment should be provided for these personnel.
3. An Esmeralda County radiological emergency response plan (or at least an annex to the current plan) should be developed. This County radiological plan should be consistent with the State radiological emergency response plan which is being developed.
4. If the State establishes a permitting system for carriers of spent fuel within Nevada, Esmeralda County should be provided access to this information, as well as having the State notify its County Sheriff's Department in advance of all shipments.
5. Esmeralda County should take all necessary steps to ensure it is linked to any statewide communication system that is implemented.
6. Efforts to estimate and track the costs of additional equipment and training, as well as administrative costs to the County which are the direct result of the construction and operation of the proposed Yucca Mountain repository should be made. These costs should be reimbursed to the County by the Department of Energy.

7. The County Emergency Operations Center should be relocated, re-equipped, and training provided to duty officers. This recommendation should also be examined under the current conditions and evaluated for its viability as a short-term recommendation.
8. Esmeralda County should participate with the State in determining the nature and extent of Federal response capabilities to a transportation accident involving spent fuel. The County should become more than familiar with Federal response and coordination procedures, and work with the State to make sure that adequate mitigation measures are put into effect.
9. Esmeralda County should act to ensure that regional resources (Nye and Mineral counties, at a minimum) can be formally drawn upon through Mutual Aid Pacts in the event of a major incident. In addition, Esmeralda County personnel should exercise their Plans in conjunction with these other counties. Coordination of response, at all levels, must be ensured.

## I. INTRODUCTION

This study examines the emergency response resulting from the explosion of a tractor trailer carrying approximately 42,000 pounds of Department of Defense (DOD) highly explosive materials on November 21, 1990. The examination includes a detailed exploration of the event, and the emergency response to the explosion. Specific attention is focused on the emergency response of Esmeralda County agencies and personnel with regard to their actions and performance in responding to the emergency event.

After examining the event and the Esmeralda County response, the nature and extent of the risk resulting from the transportation of hazardous materials on U.S. 95 through Esmeralda County and the Town of Goldfield is scrutinized. This examination of risk explores the nature of the materials being shipped, their volume, and data pertaining to accident rates along the Esmeralda County stretch of U.S. 95. In addition, this second section of the report utilizes the response to the munitions truck fire, and the risk assessment, along with the interviews of Esmeralda County emergency response related personnel, to estimate the current emergency response capacity to transportation of hazardous materials events in the County.

The final sections of the report focus on the proposed shipments of high-level nuclear waste materials to the contemplated Yucca Mountain Repository. The specific focus is the U.S. Department of Transportation regulations for transporting the waste, the State of Nevada's preferred system, and the response requirements for any transporting incidents. These requirements and needs are then compared to the current capacity of the Esmeralda County emergency service related agencies and personnel as evidenced in the munitions truck explosion, and the preceding analysis. The conclusions of the study focus on current and future emergency

management capacity needs of the County to deal with shipments of hazardous materials in general, and high-level nuclear waste in particular.

## 1.0 THE EMERGENCY EVENT AND THE RESPONSE

The major focus of this section of the report is on the fire which broke out on a tractor trailer truck carrying highly explosive materials through Esmeralda County on the evening of November 21, 1990. This examination relies on the logs of the Esmeralda County Sheriff's Department, the Nevada Division of Emergency Management (NDEM), as well as interviews with emergency service personnel who responded to the event. Interviews with personnel from the Esmeralda County Sheriff's Department, the County Department of Emergency Management, fire services, emergency medical services, and the Repository Oversight Program were conducted during two field trips in May of 1992. The Department of the Army has not released any information concerning this incident, however, when pertinent, information concerning the accident of January 4, 1991, involving a truck carrying similar explosives will be utilized for comparative purposes.

It was not possible to gather all of the data which would explain this November 21, 1990, incident (Herlong logs, for example). Yet, it is important to note that the interviews of emergency personnel and the logs which were examined are all very strongly associated with each other and, except for minor details, parallel each other to a remarkable extent. Under these circumstances it is very likely that the major details of what occurred can be accurately portrayed based upon the existing data sets.

### *1.1 The Incident and Initial Response*

At approximately 9:14 PM the evening of November 21, 1990, the Esmeralda County Sheriff's Department received notification from the Las Vegas Nevada Highway Patrol (NHP) dispatch that an 18 wheeler with 42,000 pounds of explosives was on fire south of Goldfield (see

Figures 1 and 2). The driver of the privately owned truck had apparently become aware of the fire aboard the trailer, which was probably caused by an overheated brake or tire, disconnected the tractor and drove it to the Cottontail Ranch where he called the NHP to notify them of the fire and danger. The location of the burning trailer was south of Goldfield, and Lida Junction (Nevada Route 266) about 1 mile from the Nye County line.

An Esmeralda County Sheriff responded almost immediately and within 11 minutes reported having set up a roadblock of two tractor trailers across U.S. 95 near Cottontail, and approximately 1 and ½ miles from the burning truck (approximate time was 9:26 PM). The Goldfield Fire Department was informed of the incident at approximately 9:20 PM and responded with all available units. The Fire Department did not have a chemical fire truck equipped with foam to fight chemical fires (this capacity was only obtained in June of 1991). The fire fighters responded with a 1,000-gallon pumper and a little later with their 2,500-gallon water pumper. These units arrived at about 9:32 PM. One unit stopped at the roadblock established by the Sheriff's Department and one unit proceeded about ½ mile closer to the burning truck. These fire personnel from Goldfield are all volunteers.

The emergency medical services (ambulances) were not paged until about 9:25 PM. These emergency medical services are staffed by all volunteers. Communications between the emergency medical services and the Sheriff's Department were established and communications with the ambulance sent from Beatty were facilitated through the Nye County Sheriff's Department. The emergency medical service team arrived at the roadblock at 9:32 PM.

During this initial response, the Director of Emergency Management for Esmeralda County had not been notified of the incident. Fortuitously the Emergency Management Director

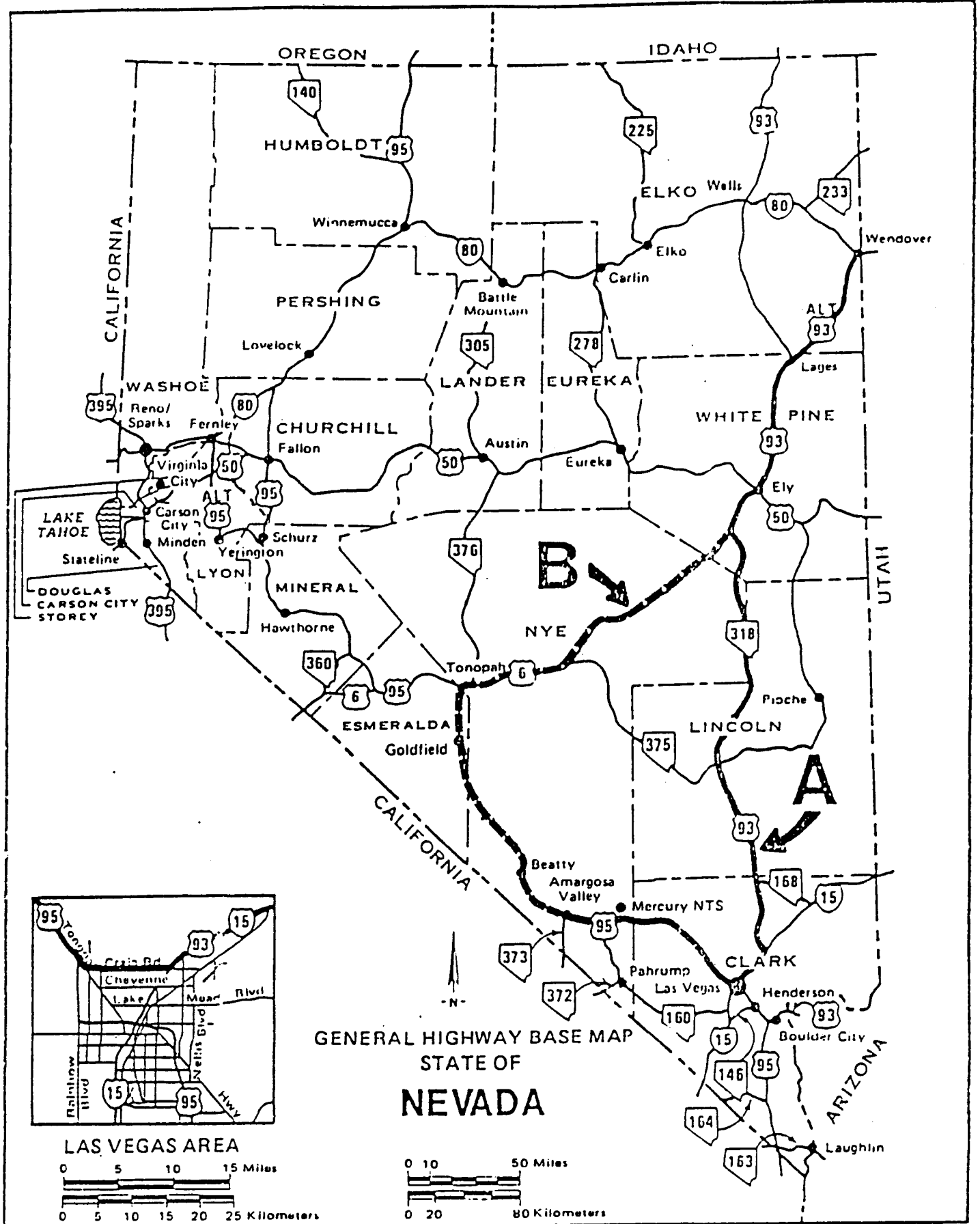
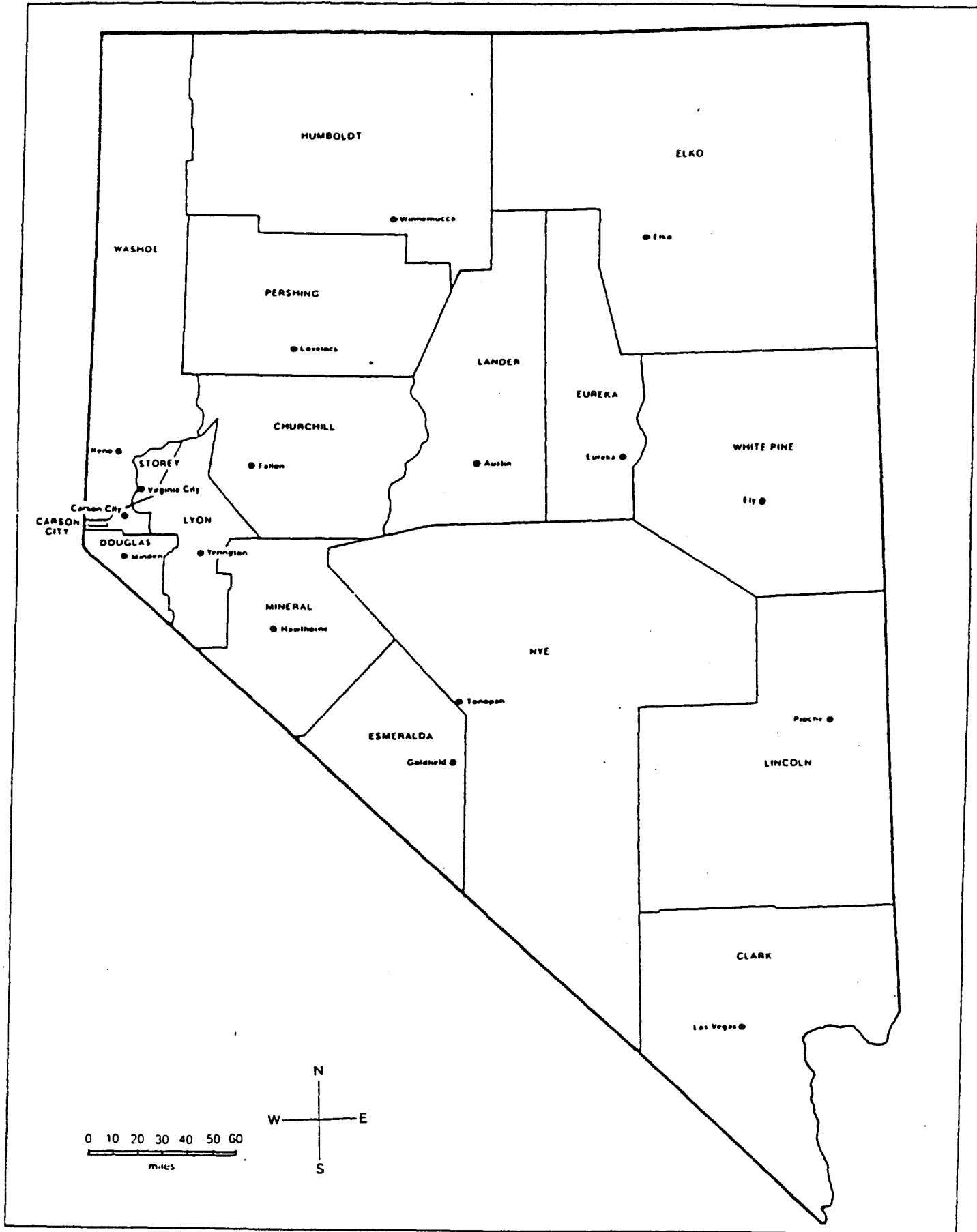


Figure 5. Routes Identified by StateGEN From Wendover to Mercury

# Counties and County Seats



was monitoring the Esmeralda County Sheriff's dispatch frequency while at home and he contacted the Sheriff's Department by phone, as well as the State Division of Emergency Management (NDEM). The NDEM attempted to obtain information from Herlong concerning the nature of the cargo aboard the trailer. While the trailer was placarded, the U.S. DOT material identification number code was not listed in the DOT Emergency Response Guide Book or any other reference book available to the NDEM. The Army refused to specify the exact nature of the explosives and the NDEM reported to the Director of Emergency Management in Esmeralda County at 9:58 PM that the truck was carrying some type of ordinance materials, probably rocket fuel. This information was received some 22 minutes after the trailer "blew" at 9:36 PM. The explosions were reported as being seen as far away as 45 miles from the scene. The specific nature of the cargo (Class A rocket propellant and MLRS rocket pods) was not discovered until the Herlong team arrived the following morning.

While personnel from the Esmeralda County Sheriff's Department had setup a roadblock north of the incident, a Nevada Highway Patrol officer had established a similar roadblock south of the incident very near the county line. In addition, emergency medical services and fire trucks were also dispatched from Beatty. The NHP Officer who had established the roadblock south of the truck examined the trucker's manifest which indicated he was carrying emergency ordinance. This manifest proved to be correct but was too general to be of much help to the emergency service personnel. While both the Esmeralda County Sheriff's Department and the NHP were able to communicate with each other, there appears to have been some communications difficulty because of the different radio bands in use by the various responders.

All those interviewed suggested that additional handheld radios would have heightened radio communications among responders.

During this initial stage of the response several observations should be made clear. First, there appears to have been no clearcut designation of an on-scene commander, although the Esmeralda County Sheriff's Office was clearly in "command" of the incident through its dispatch center and communications linkage in Goldfield. Second, communications between Nye County emergency response personnel and the NHP which were south of the burning truck, and Esmeralda County and Goldfield emergency responders were problematic. These communications were augmented through the two county sheriff's departments, and one handheld radio both north and south of the incident. Yet, most emergency service personnel could not communicate directly with each other. Third, vital information concerning the cargo which was on fire was not obtained until after the initial explosions. In addition, the shipping manifest was not helpful and the Army's Herlong Base was not able to provide vital information concerning the classified cargo. Finally, the person who would be designated as the lead in coordinating the response to this type of event was never directly contacted and informed of the incident. Rather the Emergency Manager for the County learned of the event because he was monitoring his radio that evening. In addition, almost all of the emergency service personnel from Esmeralda County (with the exception of the Sheriff's Department) were either part-time personnel or volunteers who lacked sufficient training or equipment to respond to the event in an important and meaningful way (discussed below).

## *1.2 The Continuing Response and Recovery*

Once the munitions truck exploded it continued to burn and there were periodic explosions. Both the Esmeralda County Sheriff's Department and the Director of Emergency Management (EM) attempted to have traffic rerouted. In addition, efforts were made to obtain aid from Federal authorities. These two efforts are the focus of this section.

Road closures and traffic reroutes must technically be approved by the Nevada Department of Transportation (NDOT). The on-scene personnel from Esmeralda County and the NHP, along with the EM attempted to obtain authorization for a reroute. The EM worked through the NDEM which has responsibility for coordinating state and federal response to these types of incidents, but at the request of NDEM sought authorization from the Las Vegas NHP for the rerouting. The Las Vegas NHP would not authorize the traffic rerouting and road closure. Instead the EM was advised that NDOT made all decisions on reroutes. Despite the lack of authorization from NDOT, traffic was rerouted off of U.S. 95 onto Nevada 266 near Lida Junction. The roadblock appears to have been established by 11:25 PM and the rerouting was eventually approved by NDOT through Wayne Wallace in the Tonopah office who visited the site. In addition, U.S. 95 was also closed south of Tonopah. Yet, communication between the NDEM and the EM in Esmeralda County with NDOT personnel seems to have been sporadic and confused during these efforts to obtain authorization to close the roads.

The large number of vehicles which were stopped north of the burning truck would have to use Nevada 266, or double back to U.S. 6 in Tonopah. Many of these vehicles, especially those with four-wheel drive, chose to avoid this extra driving. Instead, these vehicles went off-road along a railroad track to the west and circumvented the burning truck. These actions

were potentially dangerous to the drivers of the vehicles, and clearly demonstrate insufficient control and manpower at the incident scene. The road was reopened at about 6:30 AM on November 22.

The necessity of bringing in outside expertise to supervise the clean-up of the explosive materials was evident almost immediately. Yet, the NDEM was unable to obtain help from Nellis Air Force Base. The Herlong Base was not able to dispatch a team until daylight the next morning. The reason for the delayed response at Herlong is unclear because of the Army's refusal to release any information concerning the incident. Indeed, the Army Base initially suggested that since the cargo was being carried by a private carrier and the shipment originated at Hawthorne, it was not their responsibility. The Herlong team arrived early in the morning probably between 6 and 7:00 AM on November 22.

The apparent lack of response by the military to the November 21 emergency incident contrasts sharply with those of an incident on January 4, 1991. This incident was caused by poor weather and icy conditions resulting in an automobile hitting a stopped tractor trailer carrying explosive ordinance. Two passengers in the auto were dead at the scene which was between Tonopah and Goldfield on U.S. 95 around mile post 31. In this case, the accident occurred at 10:48 PM on January 4. The roads were closed by 12:05 AM on January 5. More importantly, both Nellis and Hawthorne responded to the incident with teams and equipment. Information released by the Army indicates the truck was carrying 32 pallets of propellant explosives, solid Class B explosives. Nellis dispatched two ordinance specialists, Hawthorne sent forklifts, and arrangements were made to provide another tractor trailer by the Army

through a private contractor. While Nellis did provide a security team at the incident site, they refused to aid in the offloading of the cargo.

The two incidents contrast sharply in the response by the military. In both cases explosives were being transported through Esmeralda County, and in both cases County emergency services personnel and sheriffs were unaware of the transport. In the first incident, perhaps because of the fire and the driver leaving the scene, emergency service personnel were unaware of the nature of the danger posed by the emergency until after the explosions. In the second incident, the military assumed responsibility for the clean-up and part of the response very quickly, perhaps because of their earlier experience. In addition, Hawthorne, Herlong and Nellis appear to have communicated well with each other. Yet, most importantly, the January 4 incident demonstrates that coordination among federal agencies continues to be problematic in these types of incidents. Further, the communication with state and local response agencies is still poor and needs improvement. Before analyzing the specific response to these incidents and the capacity of emergency service personnel, it is important to provide an understanding of the transportation risk in Esmeralda County.

### *1.3 Evaluation of the Response*

The response to the munitions truck explosion requires an evaluation to determine where the emergency management system needs to be strengthened. The areas of emergency management in need of strengthening will be listed and selectively discussed. It is important to note that many of the problems associated with the response by County personnel to this incident would have been predictable given current capacities. That is, the weaknesses identified are not usually the result of poor performance, but rather a function of a lack of capacity in both

training and equipment among the County responders. Indeed, our analysis suggests that the County personnel, largely volunteers or part-time employees responded in an exemplary manner. What is a problem is the lack of resources in the County to manage these types of incidents.

1. The County Emergency Management Plan was either not followed, or is need of review and revision as evidenced by the fact that the County Director was not informed of the incident by the Esmeralda County Sheriff's Department or other EM personnel.

Clearly, if the Comprehensive Emergency Management Plan for the County had been utilized during this incident by the Sheriff's Department, assuming that they had been adequately prepared through exercises and other means, the Director of EM would have been notified immediately. This failure of communications was overcome because the Director was monitoring his radio frequencies. Yet, the County cannot depend upon these types of good fortune in the future. The initial lesson from the response to this incident is that the County Plan must receive greater emphasis and emergency personnel must become more familiar with the procedures specified in the document.

2. The inability or unwillingness of the military (Nellis and Herlong) to provide trained personnel and equipment to manage the incident in a timely fashion, and more importantly to even identify the nature of the classified cargo which potentially endangered emergency personnel, points out several problems.

First, the County emergency personnel are inadequately trained to deal with hazardous materials incidents (see Chapter 3 for a discussion of these training needs). Current training among EM responders for hazardous materials incidents involving transportation entails little more than placard identification. Second, the placard on the truck did not permit identification

by either local or State EM personnel, and the Herlong officers would not identify the load. This lack of information could have resulted in injuries had the responders not used the correct degree of caution. Given the amount of hazardous materials traveling through the County, the State and County must both improve their training and work to establish a relationship with the military which reduces the risk to emergency responders and citizens in the County. The military was far more responsive in the January 4, 1991 incident.

3. Coordination problems manifested themselves in several ways during the response. The coordination difficulties are clearest in the efforts by the Director of Emergency Management and the Sheriff's Department in closing roads. In addition, the coordination between the State DEM and NDOT was lacking. While the road closures were effected, future efforts should be made to simplify and streamline the process, as well as ensuring better communication. The roads were closed more effectively and with greater coordination in the January 4, 1991 incident. The lack of coordination also was manifested in the difficulty in identifying the truck's cargo discussed above.

4. There were several difficulties with communication among the different emergency responders. These difficulties are in part a function of the different frequencies used by the responding agencies (for example the NHP which uses low band and emergency management and fire which use high-band frequencies). Most of these difficulties were a result of the lack of State coordination of radio frequencies, and the lack of a statewide communication system. It is imperative that until such a State system is developed that emergency personnel have a sufficient number of handheld radios to permit communication among all emergency responders.

This was not the case during these incidents. Communication is the key to effective response, and while it does not ensure good response it all too often prevents it.

5. The lack of coordination, communication and adequate training and equipment resulted in a response which was hampered by poor information and little more than watching the truck's cargo burn and explode. Under the circumstances this was the correct response, a fortuitous outcome. Yet, had there been injuries or contamination, the lack of adequate training, equipment and communication and coordination might have resulted in dire consequences. Intergovernmental coordination of response must be heightened. This responsibility can not be implemented by the County alone. The State agencies and military must also cooperate. In addition, the closest HAZMAT teams must be willing and able to respond. This is not yet the case. Given the nature of the risk in Esmeralda County (next chapter), efforts should be made to obtain some regional HAZMAT response capability by working with the neighboring counties.

6. Esmeralda County, along with Nye County (in Tonopah), lack sufficient equipment to decontaminate any injured citizens. Had the incident resulted in injuries and the release of toxins, injured parties could not have been transported by EMS to the receiving hospital in Tonopah. This lack of capacity should be rectified by attempting to work with neighboring counties and pooling resources.

In short, the response reveals that Esmeralda County personnel, part-time employees and volunteers are committed individuals who responded in line with their training, equipment and capacity. It also reveals that the level of capacity is probably inadequate to meet any major

hazardous materials incident. This point will be developed in the next two chapters which focus on the risk of such events and the capacity of responders.

## 2.0 THE NATURE OF THE TRANSPORTATION RISKS

### 2.1 Introduction

This section of the report addresses a fundamental aspect of an assessment of emergency management. This aspect involves an analysis of the risks of transporting hazardous materials through the county.

### 2.2 Nature of the Risks: The Extent of Hazardous Materials Transportation

In order to adequately allocate resources for emergency response to hazardous materials incidents it is important to understand the nature of the risk. In this case, the focus on risks includes the extent to which carriers of hazardous materials utilize U.S. 95 and other roads through Esmeralda County, Nevada. This focus examines the number of trucks carrying hazardous materials, the types of hazardous materials transported, and the tonnage by type. These factors are considered to answer the question, To what degree is there the potential for a serious transportation accident involving the release of hazardous materials? The first step in answering this question is to examine the volume and classes of hazardous materials that are shipped through Esmeralda County.

The basic source of hazardous materials transportation data is the *Commodity Report*, April 1991, prepared by the Nevada Department of Transportation. The data in this report include hazardous material movements by tonnage and type. The report displays the commodity flow data on the basis of average daily traffic. In addition, the data are representative of "external" commodity movements and not local shipping or shipments on small local or county roads. In Esmeralda County data for only two road segments have been collected. These are:

"segment 54" — U.S. 95, from FAS<sup>1</sup> 374 in Beatty to U.S. 6 in Tonopah; and "segment 30" — U.S. 6/95, from Gabbs Road north of Tonopah to FAS 360. While parts of these segments lie outside the County, the transportation volume along the entire segment should not change appreciably. Moreover, the sample of trucks was taken from a point along the segment. Thus, the volume taken at that point become representative of the volume along the segment. Because hazardous materials shipments on county roads connected to mining operations have not been included in the report, the data consequently underestimates the true volume of hazardous materials movements in the county.

However, the "external" movements of hazardous materials on these major highway segments should present a fairly reasonable profile or gross level estimates of the volumes transported. These data represent shipments in 1989 based on a survey of 45 sites in the State with a total sample of 10,109 trucks.

Another problem with the data is the under-reporting of hazardous materials shipments by the U.S. Department of Defense (DOD) and the U.S. Department of Energy (DOE). The Nevada Department of Transportation (NDOT) does not have the authority to survey DOD shipments. The commodity flow data in the NDOT report, consequently, is exclusive of DOD wastes. Given the fact that a substantial amount of hazardous materials from military installations and storage depots may be transported along U.S. 95, the exclusion of U.S. DOD shipments is a serious, but unavoidable deficiency in measuring hazardous materials transportation volumes. However, according to Esmeralda County estimates which are based

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<sup>1</sup>Federal Aid Secondary (FAS) refers to a U.S. DOT designation given to a route which receives federal monies for maintenance and enhancement and are smaller than designated primary roads.

on State notifications prior to low-level radioactive shipments there were 37 shipments of low-level radioactive materials last year on U.S. 95.

Data on hazardous materials shipments from military bases was not included in the report which would tend to underestimate the volume of total hazardous materials shipments in the County. The estimate of hazardous materials volumes transported on U.S. 95 is particularly relevant to this assessment. First, U.S. 95 is the major highway running south-north through the County. Second, U.S. 95 passes directly through Goldfield, the county seat and population center, and at a point where U.S. 95 turns sharply. It is at this particular "critical curve" in Goldfield where numerous truck incidents/accidents have occurred. Indeed, the curve in Goldfield is the only one designated as "critical" in NDOT's Phase 2 study. Third, the munitions truck explosion under examination in this report occurred on U.S. 95.

Based on data in the NDOT report, U.S. 95 carries 4,782 tons of commodities on an average daily basis. This tonnage represents the third largest daily volume of commercial traffic on Nevada's highways. On an average day, the segment of U.S. 95 from Beatty to Tonopah, carries 12.6 tons of petroleum and natural gas products and 15.4 tons of ammunition/explosives. In total, the average daily tonnage of hazardous materials on U.S. 95 in the County is 173 tons or 63,145 tons per year.

Table 2.1 shows the percentage distribution of hazardous materials trucks by hazard class (United Nations Hazardous Materials Classification). The percentage distribution is for U.S. 95 and for the two segments of U.S. 95 within Esmeralda County. Based on the average daily hazardous materials truck traffic, we can expect an average of 6,205 hazardous materials trucks annually on these two highway segments in the County. Moreover, in another study on

transportation risks in Nevada, the data show that we can expect over 5,000 trucks annually carrying hazardous materials on U.S. 95 alone through Goldfield<sup>2</sup>. Again, it is important to note that these data underestimate the real volume of hazardous materials transported through Esmeralda County.

TABLE 2.1

United Nations HM Class	Description	Percent of Hazardous Materials Trucks		
		U.S. 95	Segment 54	Segment 30
1	Explosive*	4.6	12.5	5.9
2	Gases (Flammable, nonflammable, poisonous)	10.2	12.5	11.8
3	Flammable liquids	59.6	62.5	58.8
4	Flammable solids; spontaneously combustible materials	5.7	12.5	5.9
5	Oxidizers and organic peroxides	5.1	--	11.8
6	Poisonous and etiologic materials	0.9	--	--
7	Radioactive materials	0.7	--	--
8	Corrosives	13.2	--	5.9

\*These estimates are exclusive of DOD shipments which are not reported.

<sup>2</sup>Data taken from *Yucca Mountain Transportation Routes: Volume II*. Transportation Research Center, University of Nevada, Las Vegas, May 31, 1991. NWPO-TN-011-91. This was based on an average of 14 trucks daily on this route.

### 2.3 Potential for Accidents Involving Hazardous Materials

This section of the report provides information related to the potential for accidents involving hazardous materials shipments. The level of risk associated with such shipments is a function of the probabilities of accident events and the consequences of these events in terms of fatalities, economic impacts, and other adverse social effects. A probabilistic risk analysis of hazardous materials transportation accidents, however, is outside the purview of this study. Nevertheless, sufficient secondary information is available to show the potential for truck accidents along U.S. 95 through Esmeralda County. The data elements used in a risk analysis report of routes for nuclear waste shipments in Nevada<sup>3</sup> included existing truck accidents rates, the number of hazardous materials shipments, land use (urban population), population densities along transportation corridors, characteristics of the infrastructure, environmental conditions, and difficult evacuation locations. U.S. 95 within Esmeralda County was designated by the following route segments in the report: Segments 4.2, 4.3, 4.4, 4.5, and 4.6. Segment 4.1 was in the Tonopah area just north of the County, and route segment 4.7 was in the Beatty area just south of the County (see Table 2.2). These two route segments (4.1 and 4.7) while just outside the County were identified in the report as the two locations with extremely high levels of risk for hazardous materials transportation accidents, and especially dangerous for nuclear waste accidents.

While outside the formal boundaries of Esmeralda County, severe accidents involving hazardous or nuclear materials at these two locations can certainly impact Esmeralda County in

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<sup>3</sup>Transportation Research Center, University of Nevada, Las Vegas. *Yucca Mountain Transportation Routes: Preliminary Characterization and Risk Analysis*. Volumes 1 and 2. May 1991.

terms of consequences and threat, and the County should be prepared to deal with situations near the county line. At a minimum, a severe accident on U.S. 95 near Tonopah would create enormous traffic problems on that route within Esmeralda County.

The data on U.S. 95 in the County show that the volume of traffic in general and truck traffic specifically has been increasing in Esmeralda County over the 1984-88 period from which data was obtained. The number of truck accidents fluctuate over time and are not consistent. For the 1984 to 1988 period, Route segment 4.4 had one to two reported accidents annually. Route segment 4.4 runs through the city of Goldfield. In contrast, interviews with emergency response personnel indicate that during the last three years at least five truck accidents have occurred on U.S. 95 in Goldfield. Of particular concern is the extreme curve of U.S. 95 in Goldfield where these accidents have occurred.

TABLE 2.2  
Traffic and Truck Accident Rates on U.S. 95 Route  
Segments in Esmeralda County

Route Segment <sup>1</sup>	Total Traffic 1988	Truck Traffic 1988	Truck Accidents			Truck Accidents (MTMT) <sup>2</sup>		
			1988	1987	1986	1988	1987	1986
4.2	719,050	108,040	0	0	1	0	0	50
4.3	688,025	110,230	0	0	0	0	0	0
4.4	834,025	116,800	1	1	2	663	695	1,631
4.5	838,375	107,675	1	1	0	64	69	0
4.6	578,525	115,705	0	3	0	69	42	0

<sup>1</sup>These route segments are within Esmeralda County.

<sup>2</sup>MTMT truck accident rate is the number of truck accidents per million truck miles traveled.

The information on prevailing accidents suggests that the number of truck accidents is increasing, and that a large share of these are occurring in Goldfield. The report on the risk analysis of various nuclear waste shipment routes specifically identifies the dangerous characteristics for hazardous materials shipments at the "Goldfield curve." The Director of Emergency Management for Esmeralda County has attempted through NDOT to place raised "buttons" on the roadway leading up to the curve, but because these "buttons" impede snow removal no action has been taken.

Despite traffic warnings directed at the "curve" in Goldfield, serious truck accidents have continued at that location. Some of these accidents have included trucks carrying hazardous materials.<sup>4</sup> The potential, however, is quite high for a major serious accident involving a truck carrying hazardous materials today. Certainly, if U.S. 95 is selected as a route for nuclear waste shipments, the traffic involving hazardous materials carriers will increase sharply making the Goldfield curve into a particularly dangerous and high risk location.

The town of Goldfield has a population of about 500 persons which is about typical of rural Nevada towns. Mitigation planning including evacuation response capabilities should be given high priority for this area including training and response needs. The increasing number of truck accidents in the Goldfield area combined with an anticipated increase in truck traffic using U.S. 95 through Esmeralda County and a particularly dangerous infrastructure situation results in a high potential for a severe accident with serious consequences. Interviews with County emergency response personnel indicate that the level of risk related to hazardous

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<sup>4</sup>Relying on the memories of some of the emergency response personnel leads to the identification of at least three such incidents involving hazardous materials over the last 13 years.

materials transportation may be even more serious than the accident reporting suggests. According to these interviews, emergency response personnel responded to approximately 8-10 transportation incidents during 1991 involving hazardous materials in Esmeralda County. While not all of these events resulted from accident conditions, the fact that as many responses were required for a small rural county suggests the existence of a potentially serious situation.

The risk analysis report by the University of Nevada at Las Vegas, also attempted to identify "potentially critical locations" for truck accidents. Five criteria were specified for the identification process. These were: population impacts, costs, difficulty of accident clean up, environmental impacts, and accident severity. The town of Goldfield was specifically mentioned in terms of potential population impacts. Moreover, Goldfield's transportation infrastructure along "a critical curve" should be further considered as a critically dangerous location. Route segment 4.5 was also identified as an area presenting difficult problems with respect to evacuation.

The examination of the nature of the risks suggests that a potentially serious situation exists. A summary of the information available from secondary sources and interviews shows the following:

- (1) Traffic volume along U.S. 95 through Esmeralda County has increased over the last few years, including truck traffic.
- (2) Over 5,000 trucks annually will transport hazardous materials over U.S. 95 through Esmeralda County. This number is an underestimation of the real level of shipments due to natural under-reporting of hazardous materials shipments and the U.S. DOD policy not to report munitions and other types of shipments. In

addition, 37 notifications were given to the County by U.S. DOE in 1991, of radioactive materials shipments in the County.

- (3) There continues to be several truck accidents yearly in the town of Goldfield. Some of these result from the "critical curve" situation in the town. Despite warnings of the curve and posting of speed limitations, truck accidents at that location persist.
- (4) Emergency responses to approximately eight hazardous materials transportation events occurred in 1991. In addition, the Sliver Peak ambulance services had approximately 60 calls in 1991, and 75% of these were motor vehicle and transportation-related. These accidents seem relatively high for a rural county with a low population, and places enormous fiscal stress on the County budget.
- (5) The risk analysis report (referenced above) that assessed several Nevada routes for nuclear waste transportation, specifically identified Goldfield as a critically dangerous location for transporting hazardous materials. Two nearby areas — Tonopah and Beatty — were also identified as particular critical locations due to the high prevailing accident rates, or exposed population and difficulties during evacuations.

### 3.0 EMERGENCY MANAGEMENT CAPACITY

Having assessed the nature of the emergency incident and the response by emergency service personnel, as well as having examined the extent of the transportation risk, it is now appropriate to provide an analysis of the emergency management capacity in Esmeralda County. This emergency management capacity analysis is combined with a discussion of what, under current risk circumstances, the capacity should entail.

#### *3.1 Capacity Inventory*

Capacity refers to such items as the level of training of personnel to respond to emergency incidents involving hazardous materials transportation events, the adequacy of equipment available to emergency service personnel, and the communication system utilized by these personnel. In addition, capacity also requires an examination of emergency management and response plans, the awareness and utilization of these plans by emergency service personnel, and the ratio of volunteer to full-time employed personnel. For example, in smaller communities where risk might be characterized as low, a county or town might rely only on volunteer or part-time emergency service personnel. Yet, where risk is high and the types of incidents complex, it is inadvisable to rely exclusively on volunteer or part-time individuals to provide emergency services. Finally, it is important to also examine mutual-aid agreements which may be used to supplement emergency management resources, particularly in rural counties.

The basic questions which will guide this analysis are: Are the resources in Esmeralda County sufficient to meet existing contingencies? Would these resources be adequate to meet the type of emergency incident characterized by the munitions truck explosion if it occurred in

Goldfield? and Are the resources and emergency response capacity adequate to meet the challenges of increased hazardous materials transportation rates in the County?

### *3.2 County Emergency Management*

The analysis of the County's emergency management system reveals several important findings. First, as a result of enormous effort by several individuals and general good fortune, the current capacity and resources of the County have managed to avert loss of life or major property damage. While emergency management in the County has been able to respond and prepare for small events, it is questionable whether it would be able to manage a larger event, especially a severe one involving hazardous materials. It is likely that a serious transportation event resulting in the release of hazardous materials in a populated area would exceed the response capacity and resources of the County emergency management system. In addition, the munitions truck incident reveals little information that would suggest that the County could rely upon quick response and aid from another source.

The role of the Director of Emergency Management for the County is to maintain the Emergency Management Plan, and to coordinate the County's response to an emergency incident and provide for coordination of State support when necessary. In addition, the Director is relied upon to conduct a hazardous materials assessment, develop mitigation strategies, chair the Local Emergency Planning Committee, provide local training where appropriate, and direct emergency medical services. This last function is not paid for and is entirely voluntary, despite having part of the job requirements.

*These duties would be demanding for several employees, but the current County budget allocates a mere quarter-time salaried position to emergency management. Salary for one-half*

of this quarter-time position is paid for from federal funds through the State. The current budget allocates only \$19,000 total for emergency management, and another \$36,000 is designated for Emergency Medical Services.

The current Emergency Management Plan for the County was completed in 1986, and has been updated periodically. The most recent efforts to complete a new County Plan have been unsuccessful in attaining State approval. In addition, a draft of an emergency management plan for Hazardous Materials has also been completed, but needs to be updated, expanded and integrated into response planning and exercises.

Yet, several problems interpose themselves on the necessity of exercising the HAZMAT Plan. First, the current emergency response personnel lack sufficient training to train other personnel. While the current Director can offer some training he is not qualified to provide EMT or fire training. A Training Coordinator was only appointed in July but very limited funds exist to send personnel to training courses elsewhere, and the new coordinator will need some time before he is able to act in his full capacity.

The 1985 Emergency Management Plan was designed to deal with a major emergency and specifies procedures, and contingencies necessary for a coordinated response. The Plan covers warning, some elements of mitigation and assessment, and evacuation. The County Emergency Operations Center is located in the Courthouse and makes use of the Sheriff's Department communication network. The problems with communications have already been discussed, and there is little in the way of a backup system. If an accident were to occur in town near the Courthouse which resulted in an evacuation of the building, communications would be severely constrained.

There are serious limitations evidenced in the County's Emergency Management to those already noted. First, there is a shortage of staff support to complete and update plans. Both the Comprehensive Emergency Management Plan and the HAZMAT Plan need to be completed with the latter being integrated into current response procedures, distributed, and exercised. These exercises should involve, to the extent feasible, other jurisdictions and State agencies.

Funding should be made available for additional incident command training. This function has been improvised in the past but good fortune and improvisation are not elements to rely upon. In addition, while the County has been able to obtain mutual aid from neighboring governmental entities, no formal mutual-aid agreements exist that we discovered. As the cost or frequency of hazardous materials incidents escalates, it may become increasingly difficult to obtain support without formal agreements.

HAZMAT training is a necessity for not only the Director of Emergency Management but also for fire, law enforcement and EMS personnel. Currently, the fire fighters have only some training in HAZMAT awareness. Budget considerations have limited the training provided to fire personnel to only one who has attended the Advanced Fire Marshall's training on these materials.

While the last chapter of this report focusses on radiological response, it is important to note the lack of such training in Esmeralda County. Neither the Fire or Sheriff's Department have any formal training in radiological response short of using detection devices. Indeed, none of the vehicles of the Sheriff's Department are equipped with such devices at this time. Because there are no hazardous materials suits to handle HAZMAT or radiological events, and inadequate training, the County really has no response capability other than isolating the incidents and

observing them. They can only identify the substances by placard but not really mitigate or alleviate the conditions resulting from such an incident.

In short, given current capacities, Esmeralda County is totally dependent upon outside jurisdictions and entities to respond to hazardous materials releases and injuries. The lack of training and finalized and exercised plans further diminishes the ability of the County to adequately respond to such contingencies.

### *3.2 Fire Department*

The Fire Department in Goldfield is essentially an all volunteer department although the Fire Chief is provided a very small amount of compensation. The other fire departments in the County (Fish Lake Valley and Silver Peak) are also volunteer departments. Tonopah did send some fire personnel to the munitions truck explosion in 1990. Hazardous materials training has been limited to the basic course involving identification/awareness. There is a serious deficiency in fundamental hazardous materials response equipment, training and experience. There is really no capability in the County to effectively handle a large-scale hazardous materials or radiological contingency based on resources in the jurisdiction.

Interviews with fire departmental personnel in Goldfield indicated that both a 1,000-gallon truck and 250-gallon chemical foam truck were available. In addition, there is an old 2,500-gallon pumper which is operational. The major resource is the chemical foam truck in HAZMAT incidents. Currently, there are 11 volunteer fire persons in the Goldfield area: only 2 have EMT training and 1 has basic hazardous materials response training. There are no HAZMAT suits or other equipment which are necessary to establish control over a HAZMAT incident. In short, there is no real capacity to deal with HAZMAT incidents.

Yet, other deficiencies are also apparent in the Fire Department which would hinder their ability to respond effectively to a large HAZMAT incident. First, no evacuation exercises have been undertaken. Second, communications between the Fire Department and Sheriff's department is difficult and coordination of on-scene response by a clear delineation of roles and responsibilities has not occurred.

The lack of proper training, equipment, exercises, and coordination means that the Fire Department will probably be reduced to "pulling back and protecting their own people" in the event of a large scale incident. This is not the result of a lack of commitment or willingness on the part of the fire personnel to handle such emergencies. Rather, the Fire Department would be reduced to such a role because of its lack of capacity. In this situation, especially when considering the risk of such an incident, it seems wise to seek some regional HAZMAT capacity which might include Esmeralda, Nye, Mineral, and Lyon counties. This regional response capability is also desirable because the closest HAZMAT team in Reno has announced recently it will not respond to events outside its jurisdiction. Such regional cooperation should be augmented with additional training including decontamination courses.

### *3.3 Esmeralda County Sheriff's Department*

The Sheriff's Department has a central role in responding to transportation emergencies involving hazardous substance releases or potential releases resulting from transportation incidents. As the munitions incident revealed, the Esmeralda County Sheriff's Department was the first on-scene and played a crucial role in coordinating the response because of its communication network and designation as the County EOC.

Interviews with County Sheriff's Department indicated several weaknesses in their response capability. First, they lack sufficient equipment (masks, etc.) to enter toxic areas for traffic control or evacuation activities. In addition, they have not had an evacuation exercise despite the fact that this would be a prime responsibility for them in the event of a major incident in Goldfield or another town. Only two persons have EMT training and hazardous materials training out of the nine or so sheriffs due to recent employee turnover. Additional training has been offered to these sheriffs, but as yet they have not availed themselves to the opportunity. There are weaknesses (discussed above) in their communications network and ability to communicate with other emergency service personnel and State agencies. The Department has responded to at least two HAZMAT incidents per year. They are fully aware of some of the weaknesses in the Department but budgetary considerations have not permitted them being remedied.

Finally, with regard to radiological response capability. Radiological detection equipment, even the most basic survey meters and dosimeters are largely unavailable and not frequently calibrated by the State. (These devices are in NHP vehicles.) In addition, to the lack of training or equipment to handle any radiological incident (perhaps even identify one), there is a serious lack of awareness of such situations.

### *3.4 Emergency Medical*

In Goldfield there are two ambulances and the emergency medical personnel are volunteers. Approximately \$200 per month of compensation is provided for each coordinator of EMS. Because of the lack of hospitals in Esmeralda County, emergency medical response is particularly important. In addition, the Radiological Officer in the County also works on the

EPA, DOE and Desert Research Institute monitoring stations. There are 11 volunteer EMS personnel and training for 7 of the EMS personnel extends to intermediate EMT. Hence, there are no qualified paramedics among the EMS personnel in Esmeralda County. In addition, several of the EMS have had an eight-hour course in hazardous material identification.

The communications system of the EMS allows them to link directly with the Sheriffs in both Tonopah and Esmeralda County. The medical radio permits communication with any hospital in the State, and they have low-band radios allowing for communication with the NHP. Their communications appear to be adequate to permit them to respond effectively.

Yet, the lack of any decontamination equipment makes the effectiveness of their response to either hazardous materials or radiological incidents problematic. Contaminated patients can not be transported by these ambulances. In addition, neither Nye County or Tonopah have decontamination units. The closest units are in Las Vegas. Any serious incident would require state or other jurisdictional aid.

The radiological officer has received about 52 hours of radiological training. He has the capability of measuring both the rate and total exposure of personnel to beta and gamma rays, but not to alpha radiation. Some improvement of HAZMAT capacity is likely when the new AIM 3200 atmospheric monitoring equipment comes on-line. This equipment measures and identifies hazardous gases. Yet, the current equipment is far from ideal to ensure effective local response to either a hazardous materials or radiological incident.

Despite this equipment, the County response to a radiological incident by its EMS is likely to be limited to identification of the problem, monitoring and establishment of a safe zone for personnel. There is a severe need to upgrade training, and obtain decontamination

equipment. If decontamination of patients or other personnel is necessary the ambulances can not even be used to transport the injured because of the lack of necessary equipment. In addition, the lack of a qualified paramedic means that any treatment would have to be fairly basic to those injured.

### *3.4 Assessment of Capacity*

The evaluation of emergency response capabilities in Esmeralda County to hazardous materials releases results in findings that show severe deficiencies and limitations, especially in light of the risk factors. Capacity and risk must be considered concomitantly.

#### **Risk Factors**

The data indicate hazardous materials transportation emergencies occur yearly in the County. U.S. 95 through Esmeralda County is a major route for hazardous materials shipments and Department of Defense hazardous materials. During the last year, at least 37 shipments of radiological materials occurred on U.S. 95 through Esmeralda County. The number of shipments involving hazardous materials is likely to increase as has general truck traffic over the last few years.

The increasing rate of truck traffic is one factor in projecting accident rates. Another factor is the prevailing truck accident rates which are concentrated in the route segment (U.S. 95) through Goldfield. The severe curve in U.S. 95 at Goldfield presents a very high risk factor for transporting hazardous materials through this section of the County.

Transportation risk is a product of the probability of accident events along designated routes and the probability of consequences resulting from these accidents. First, it is important to recognize that the types of hazardous materials shipped in Esmeralda County have the

potential for disaster if released. Large volume munitions, pesticides, and propane are regularly shipped along U.S. 95. The munitions explosion is a case in point.

The large volumes of hazardous materials combined with a dangerous infrastructure element (the Goldfield curve), in the most populated center in the County, results in a very high risk situation. The level of risk is heightened because of the relatively high accident rates occurring at that locale. This combination of risk factors results in the potential for a hazardous material disaster in Goldfield.

### **Response Resources and Capacity**

The potential for disaster infers a relationship between risk and level of preparedness. Are the emergency response resources capable of preventing, responding, and mitigating a serious emergency situation involving hazardous materials releases from transportation accidents? Our evaluation indicates severe deficiencies in response capabilities.

These deficiencies include the following:

- (1) Lack of adequate funding to hire sufficient staff to complete existing and ongoing studies and to begin new studies and plans.
- (2) Lack of adequate funding to ensure a higher level of professionalism in emergency management. Currently, the County's emergency manager is paid quarter-time. This level is too small to ensure adequate management and planning functions, let alone mitigation and preparedness activities.
- (3) Although volunteerism is motivated and participation levels are high, their availability is not sufficiently reliable and personnel lack training to handle larger than typical small emergencies. The personnel resources based on volunteer

efforts as observed in Esmeralda County are not capable of responding effectively to major hazardous materials emergencies. A greater "trained professional" counterweight will be required to handle serious emergencies because local responders lack sufficient training and equipment.

- (4) The level of local equipment and training in hazardous materials response is severely inadequate to meet a major accident. This includes both fire and emergency medical equipment. No decontamination equipment is available to even transport contaminated victims of hazardous materials exposure.
- (5) Formal mutual aid agreements have not been promulgated. The lack of adequate resources to respond to serious emergencies have been supplemented in the past by support from neighboring jurisdictions. There are several problems inherent in this situation. First, most of the neighboring jurisdictions are not adequately represented themselves in hazardous materials response capacity. Second, response assistance is not assured and can vary. Third, Washoe County has indicated that it will not provide assistance from its hazardous materials response unit, and it is unclear if the Clark County team would respond. Liability issues have confounded nonformal assistance between jurisdictions.
- (6) Emergency plans are currently not sufficient to reduce, prevent, and respond to hazardous material threats. While agency roles and procedures are noted, the plans are incomplete and require updating. There are no plans or strategies evaluated for accident prevention and risk reduction through re-routing, route designation and restrictions, notification requirements for special shipments, and

other factors. Plans for evacuation have not been developed, nor have evacuation exercises been undertaken. While an emergency management plan exists, interviews with agency directors indicate strongly that questions of command and control and communications confront even these small, generally volunteer organizations. Problems related to intergovernmental roles and coordinated response have not been addressed, and the case study shows that these may very well hamper response.

- (7) Overall, the emergency capacity to be prepared and to respond to hazardous materials events is severely limited. The County has not invested in emergency response resources — planning, equipment, training — that would enable it to respond, even at a basic level, to a serious hazardous materials emergency. The vulnerability of the Goldfield area to a disaster is high, not only because of the risk elements identified, but because of very severe lack of capacity to respond to such events in any meaningful way.
- (8) Intergovernmental aid and response from the military has not been sufficient, timely or well-coordinated. This lack of support must be corrected especially in light of the large number of military cargos using U.S. 95.

## **4.0 EMERGENCY MANAGEMENT AND THE HIGH-LEVEL NUCLEAR WASTE SHIPMENTS**

This final chapter of the report examines the implications of the findings from previous chapters for emergency response to shipments of high-level nuclear waste through Esmeralda County. This is accomplished by first reviewing what some of the basic preferred system elements are for the State, and comparing these elements to the risk findings of Chapter 2, and the capacity findings of Chapter 3. This analysis is not as detailed as originally envisioned because the current County capacity is so weak. That is, the County while facing high risk from the number of shipments of hazardous waste nevertheless has little capacity to manage a serious hazardous waste emergency incident. In this context, we have already examined the capacity of the County as it applies to radiological incidents and found it was even less well developed than the capacity to manage hazardous materials incidents.

Yet, the risk of radiological incidents is in part a function of the number of shipments of these materials. It has already been discovered that there were 37 shipments of radiological materials through the County last year, and that this traffic is increasing. This estimate does not include military shipments of radiological materials because they are not required to notify the state of such shipments.

More importantly, if the Repository is constructed at Yucca Mountain, the U.S. Department of Transportation (DOT) has already indicated that one of the major preferred route for shipment is U.S. 95, directly through Esmeralda County. When the NDOT route selection process is completed, it is anticipated that this route will be designated to carry the vast majority of spent fuel shipments to Yucca Mountain. The volume of these shipments would alone result

in increased risk of accidents. Given the current lack of capacity to handle incidents involving radiological materials in the County, not to mention high-level radioactive waste materials, the risk will increase to Esmeralda County residents regardless of the safeguards that DOE has promised because of increased shipments. Furthermore, the military's cooperation on the munitions truck explosion raises some questions as to how much outside aid, the County can depend on receiving from federal and state agencies and the military in the event of a major incident, and the timeliness of this help. More importantly, given the lack of emergency management capacity of the County, and the likelihood they will be first responders to any incident involving these materials, the County will have only a minimal role unless its capacity is increased. It will be reduced to standing back and waiting for outside aid, unable to even determine the extent of danger or carry out expected local emergency management functions such as evacuation or removal of injured individuals. Hence, if there is a local role it will be dependent upon an increase in emergency management capabilities.

Because of these facts, it will not be necessary to provide too much detail on the State preferred system, or Esmeralda County's emergency management capacity. The County's capacity could not meet the demands of a radiological incident. Yet, it is instructive to see just how far off current conditions are from the preferred State system.

#### *4.1 The State Preferred System*

In fact there is no single State preferred system at this time because of the lack of specificity by DOE and DOT plans for transporting the high-level radioactive waste, and the

ambiguity concerning the modal mix and final route selection for transport<sup>5</sup>. In addition, the State has not yet clearly specified what is desirable for the transport of these shipments to protect the health, safety and welfare of its citizens. Finally, there are differing views among the State agencies as to what exactly is desirable and which agency would be responsible for which activities. Nevertheless, it is possible to identify areas where some agreement exists that additional effort and activities are necessary by responders. As such, the preferred system elements listed below simply indicates where some actions are required and reflects some agency thinking in Nevada. As DOE and DOT become more specific in their plans, the State will undertake additional analysis resulting in greater specificity in their preferred system. Hence, the following discussion must at this time be highly tenuous and subject to change (see Mushkatel and Pijawka, 1989).

In the planning area, there is widespread agreement that a statewide radiological team, with greater capacity than the current one, must be assembled, and that a State radiological emergency response plan must be developed which designates functional responsibilities to the state and local factors which may be involved in response to an incident. (This responsibility is delegated to the State by the Federal Radiological Monitoring and Assessment Plan developed by DOE.) The plan must be developed with assistance of local emergency management personnel to ensure consistency with local radiological response plans which must also be developed. The plan should deal with the ever-present problem of communications among federal, state and local responders.

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<sup>5</sup>Mushkatel, A. and D. Pijawka, "The State Preferred System for Transporting Nuclear Waste", in Transportation Needs Assessment Nevada Nuclear Waste Policy Office, Carson City, Nevada. 1989.

A second element of the preferred State system involves the establishment of a statewide communication system (Mushkatel, 1989; Diversified Communication Engineering, 1988). Indeed, at the state level both Assembly Bill 352 and 719, have made it clear that the State requires some form of State system. This system may result in a 800-MHz system being established. Who will pay for such a system, and what local responsibilities will be is unclear.

Another element of the system is an information repository which permits the State to track all spent fuel carriers within the State. Assembly Bill 352 already has established such a system for hazardous waste carriers requiring that carriers inform the State of their loads and destinations. (This information is currently not shared with local authorities who remain largely unaware of what is traveling through their communities.)

There are several areas of agreement concerning how the health and safety of residents might be ensured once transport begins. First, some inspection of carriers would be carried out at points of entry into the State. Second, some escorting system would be implemented in which each carrier was escorted through the State, probably by the NHP. Notification to the State by the carriers would be required prior to permitting any load to proceed and would facilitate the escorting of haulers. Ideally some permitting system would be put in place to raise revenues to cover State costs. Ports of entry stations would be established to monitor loads and allow for the escorting of vehicles, and inspection of trucks.

There are several factors which the State feels are desirable to ensure adequate emergency response to any transportation-related incident. The statewide communication system is seen as an absolute must which will permit coordination of response. A state emergency operations center where any coordinated response could be directed and monitored is necessary.

There is widespread agreement that the state capability to respond to rail incidents needs to be improved. Additional hazardous materials equipment, radiological equipment, and communications equipment are all necessary. Some type of State warning system should be put in place.

In the area of training, there is widespread agreement that current training among first responders is woefully inadequate. As pointed out in the FRERP, federal agencies will play a largely supportive role in the event of an incident, and under the Transportation Institutional Plan (1986) the DOE will arrange for necessary training. The State would prefer to have its own trainers trained and to disseminate this training to other state and local emergency management personnel. Emergency Medical Service personnel, fire fighters, and law enforcement will all require additional and different training. In addition, there will be large amounts of additional equipment which is needed to permit these local responders to be effective.

Finally, the Henderson Commission Report and the response to the PEPCON explosion have demonstrated just how important intergovernmental coordination is to an effective response. Local Emergency Planning Committees, along with a wide assortment of local agencies need to prepare and plan for their roles in a radiological incident. A state-local organization which is only focussed on transportation incidents should be formed to allow for adequate preparation.

#### *4.2 Esmeralda County and the State Preferred System*

The potential siting of the high-level nuclear waste repository at Yucca Mountain and the transportation routes which are used will increase the risk to County residents and make additional demands upon Esmeralda County emergency personnel. As we already have seen,

the current capacity of emergency personnel is insufficient to meet the current situation involving the transportation of hazardous materials.

At a minimum the following types of changes would be necessary to become a part of the above described State preferred system. First, the emergency personnel would need to be expanded, trained, professionalized, and made full-time employees. A different or up-graded emergency operations center would have to be established. The EMS personnel would need additional training, equipment, and employees. The Fire Department would need to be trained, equipped and probably moved. Plans would need to be constructed and exercised. The current part-time or volunteer approach to emergency management would need to be abandoned. Considerable time would be needed for preparing a coordinated state-local response.

In short, the entire emergency management system of the County would need to be overhauled and changed. Enthusiasm and dedication by volunteers would be totally insufficient to deal with the increased likelihood of a major radiological incident. As it is the County's role in emergency response to hazardous materials incidents is largely to establish control in an area away from the incident's location, and to wait for outside help because of the lack of expertise, preparedness, and equipment. This role is totally inadequate now and the siting of the Repository would only make current inadequacies more visible.

#### *4.3 Recommendations*

The recommendations are based on the findings of the analysis, and are divided into two sections: short-term recommendations designed to address the current lack of capacity; and long-term recommendations which speak to capacity needs if the Yucca Mountain repository

becomes a reality. The short-term recommendations encompass a variety of actions which would also be necessary in the long-term and are therefore not repeated.

#### *4.4 Short-Term Recommendations*

1. The Director of Emergency Management for Esmeralda County should be a full-time position. It is unrealistic to believe that emergency management plans can be revised and written, along with the other responsibilities of this position, by a part-time employee.
2. Additional training of all emergency service personnel is of paramount importance. EMS, fire, sheriffs, and other personnel who are not only responders but also involved in mitigation, planning and preparedness, and recovery phases of emergency management require additional training. The nature of the risk and the volume of the hazardous materials being transported require more local expertise than is currently available. Mere identification of loads through familiarity with placards does not constitute response. Yet, even additional training would not be effective unless responders are provided with the necessary equipment.
3. The most pressing equipment needs involve a hazardous materials van that is properly equipped. Several times in this report, it has been suggested that some combination of four rural counties (Esmeralda, Nye, Mineral, and Lyon) explore the possibility of developing this capability. It is strongly suggested that State and Federal aid be sought for both this equipment and the additional training which will be necessary. The request for this aid from the federal and state sources is easily justified because much of the risk is a function of the presence of Federal facilities where shipments emanate from or are the final destination point. The State already had a permitting system for intrastate

shipments of hazardous materials, and various sources of funds. While out of the scope of this study, we suspect that other rural counties in Nevada are in a similar situation regarding the lack of sufficient equipment and training to effectively respond to hazardous materials incidents.

4. Meetings should be held with the appropriate federal agencies and representatives of the military, and steps taken to ensure a coordinated and timely response to any similar event in the future.
5. Actions should be taken to provide all emergency service personnel with hand-held radios, or an alternative communication means which permits all parties to communicate directly with each other. Until the State has taken the necessary action to resolve the communication maze that exists within Nevada among emergency responders, it is incumbent on local entities to ensure adequate communication among their own personnel.
6. The state of current planning has been found to be inadequate; partially the result of inadequate resources. These Emergency Management and Hazardous Materials Plans should be completed and thoroughly exercised as quickly as possible.
7. Formal Mutual Aid Agreements with neighboring counties should be entered into to ensure that any response that is necessitated will at least be joined into by other jurisdictions.
8. Training needs should be identified and prioritized with the aid of the County Training Officer. A training schedule should be constructed reflecting these priorities and actions taken to guarantee its successful implementation.

9. Plan annexes, especially evacuation, should be adequately exercised and corrected. All emergency response personnel should receive additional training to eliminate the possibility that the types of errors found present in the munitions truck explosion are repeated in the future.
10. Efforts should be started to upgrade the hospital facilities in Tonopah to allow it to treat contaminated patients. This recommendation follows from the development of the Hazardous Materials Team and Van. Some decontamination capability is essential along U.S. 95, a major transportation route for hazardous materials.
11. Additional full-time personnel are needed in the other areas of emergency response. While we realize it is unrealistic to expect Esmeralda County to develop a full-time fire department, or emergency medical service department, at least one full-time person should be employed in each of these areas, and appropriate training provided.
12. Emergency service personnel should be consulted immediately to determine exactly what their equipment needs are for hazardous materials response. Their recommendations should be shared with state and federal authorities, and aid from these entities sought. While Esmeralda County is not in good fiscal condition, those entities who are either responsible for increasing the risk of a hazardous materials accident in the County which jeopardizes the well-being of its citizens, or those entities which have legal responsibility for the health and welfare of the citizenry need to be petitioned for aid. There is little equity currently, when Esmeralda County citizens because of a U.S. transportation route are exposed to a high degree of risk to such accidents. It is the responsibility of higher jurisdictions to aid in the correction of this condition.

13. The Department of Motor Vehicles and the Nevada Highway Patrol should be consulted to determine if they are willing to share tracking information on carriers of hazardous materials. This information is required on all within-state shipments and includes destinations and load information. Access to this system would provide Esmeralda County emergency response personnel, including the County Sheriff, vital information for both mitigation and response functions.

#### *4.5 Long-Term Recommendations: The Yucca Mountain Repository*

In addition to the short-term recommendations listed above, if the Yucca Mountain Repository is built these additional recommendations would also apply.

1. Increased training for all emergency response personnel in radioactive materials response.
2. County sheriffs, in particular, and other emergency service personnel should be provided with dosimeters and survey meters. Training with this equipment should be provided for these personnel.
3. An Esmeralda County radiological emergency response plan (or at least an annex to the current plan) should be developed. This County radiological plan should be consistent with the State radiological emergency response plan which is being developed.
4. If the State establishes a permitting system for carriers of spent fuel within Nevada, Esmeralda County should be provided access to this information, as well as having the State notify its County Sheriff's Department in advance of all shipments.
5. Esmeralda County should take all necessary steps to ensure it is linked to any statewide communication system that is implemented.

6. Efforts to estimate and track the costs of additional equipment and training, as well as administrative costs to the County which are the direct result of the construction and operation of the proposed Yucca Mountain repository should be made. These costs should be reimbursed to the County by the Department of Energy.
7. The County Emergency Operations Center should be relocated, re-equipped, and training provided to duty officers. This recommendation should also be examined under the current conditions and evaluated for its viability as a short-term recommendation.
8. Esmeralda County should participate with the State in determining the nature and extent of federal response capabilities to a transportation accident involving spent fuel. The County should become more than familiar with federal response and coordination procedures, and work with the State to make sure that adequate mitigation measures are put into effect.
9. Esmeralda County should act to ensure that regional resources (Nye and Mineral counties, at a minimum) can be formally drawn upon through Mutual Aid Pacts in the event of a major incident. In addition, Esmeralda County personnel should exercise their Plans in conjunction with these other counties. Coordination of response, at all levels, must be ensured.