

The Projected Impacts to Clark County and Local Governmental Public Safety Agencies Resulting from the Transportation of High-Level Nuclear Waste to Yucca Mountain

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ABSTRACT

This paper focuses on the difficulties of projecting fiscal impacts to public safety agencies from the proposed high-level nuclear waste repository at Yucca Mountain, Nevada. The efforts made by Clark County Nevada, to develop a fiscal model of impacts for public safety agencies are described in this paper. Some of the difficulties in constructing a fiscal model of impacts for the entire 24 year high-level nuclear waste transportation shipping campaign are identified, and a refined methodology is provided to accomplish this task. Finally, a comparison of the fiscal impact projections for public safety agencies that Clark County developed in 2001, with those done in 2005 is discussed, and the fiscal impact cost projections for the entire 24 year transportation campaign are provided.

INTRODUCTION

This paper reports on the effort to update the 2001 public safety fiscal cost projections for Clark County and local governmental public safety agencies arising from the potential impacts of transporting high-level nuclear waste through Clark County to the Yucca Mountain Repository [1-8]. Specifically, the public safety fiscal cost projections of the planned transportation of high-level radioactive waste (HLW) is provided for Clark County and the cities of Las Vegas, North Las Vegas, Henderson, and Mesquite. The importance of focusing on public safety agencies in this paper is a direct result of their programmatic focus and mission, as well as their needs being explicitly recognized in the Nuclear Waste Policy Act, the Nuclear Waste Policy Act Amendments and in the Department of Energy's (DOE) Final Environmental Impact Assessment for Yucca Mountain. These public safety agencies are charged with protecting the health, safety and welfare of citizens in the event of an emergency, and they must be prepared to respond to radiological incidents.

In the 2001 reports projecting the fiscal costs on public safety agencies in each of the communities and Clark County were the subject of separate reports that examined the organizational structure of each entities public safety agencies, their current capacity, funding and the service standard they employed [2-7]. The studies were then integrated into a final report

for Clark County [1] and were included as part of Clark County's response to the DOE's Draft Environmental Impact Statement for Yucca Mountain. This paper expands on these previous efforts to estimate the fiscal impacts on public safety agencies by providing fiscal cost projections for the public safety agencies in the communities listed above. However, the major effort here is to extend our understanding of these fiscal estimates, by projecting them over the entire 24-years of a transportation campaign. Additionally, one of the results of the effort has been the construction of a model that aids public safety agencies to identify their needs and facilitates the determination of the fiscal costs of these impacts.

The fiscal impacts from transporting HLW on public safety agencies that are projected in this paper utilize a refined methodology employed in the 2001 studies, as well as the studies that were performed on Nevada state agencies from 1987 through 1998 [9,10]. This paper first provides a brief discussion of the methodological considerations of utilizing the case study and the marginal fiscal cost impact analysis in projecting and estimating fiscal impacts. This methodological discussion is followed by an explanation of the new scenarios that drive the study and are derived from the DOE's Final Environmental Impact Assessment for Yucca Mountain. Finally, the projected fiscal impact on public safety agencies in each of the communities is provided.

Importantly, what is being projected is not the total fiscal cost or the budget of Clark County or any local jurisdiction public safety agency. Rather, the projections reported are the result of focusing on the increment or any additional cost to these agencies that is directly attributable to the repository's siting and the related HLW transportation shipping campaign. Hence, the cost estimates represent the fiscal impacts associated with public safety agencies needs to ensure public safety that are directly attributable to the transportation of HLW, and they would not be incurred by these governmental agencies in the absence of a repository or shipping campaign.

An Overview of Fiscal Impact Analysis Methods

Two types of fiscal impact analysis have dominated efforts to estimate the impacts of the growth of governmental services [11]. These same two types of fiscal impact analysis are used in the intergovernmental literature when attempting to estimate the costs of unfunded mandates [12]. The first method for estimating or projecting costs is the average costing method and the second is the marginal cost analysis. Both methods are designed to measure projected costs to government from future development or projected actions [13, 14]. The average costing approach focuses on population or employment multiplier after establishing an average cost per unit of service and then assesses the additional demand for that service resulting from a project. There is often little consideration of either existing excess or deficient capacity to provide the service by the local entity. That is, a new project, growth or an unfunded mandate may find that existing capacity is inadequate to provide for the new demand for a governmental service. The new demand for services may require new capital construction, equipment, personnel or additional training and result in a community being unable to meet the new demands (or unfunded mandate requirements) without assuming excessive new costs.

A second method of estimating fiscal cost impacts is marginal cost analysis, which examines the current capacity to provide services and determines whether additional demands may push the

community past the threshold of its ability to provide the needed services. Marginal analysis does not assume governmental services are linear, but rather some are “lumpy” and may require new infrastructure to serve additional demand, which may have a considerably higher than average cost [11]. The series of 2001 studies examining the fiscal impact on public safety agencies in Clark County utilized a marginal costing technique based on current capacity. The marginal cost analysis is not driven by a project or proposed development, but rather by a scenario, or three scenarios in the case of the 2001 studies. Each community and its public safety agencies are viewed as a case study for the fiscal marginal cost analysis. The underlying assumption is that they differ in the degree to which they exhibit excess or deficient capacity [13, 14].

A second assumption of the analysis is that marginal changes in service demand or need may result from the scenarios and that the cost of these changes are a reaction to service excesses or deficiencies based on the capacity of the agency or community. The third assumption underlying the projections is that local standards in large part represent the criteria by which local excess and deficient service levels will be measured. Finally, the last assumption is that local department heads and personnel are the individuals best suited and most knowledgeable about their agency’s service capacity and about the future needs associated future service needs associated with new projects or mandates. In each community studied, the steps taken to implement the case study methodology in conjunction with the public service agencies are provided diagrammatically in Fig. 1.

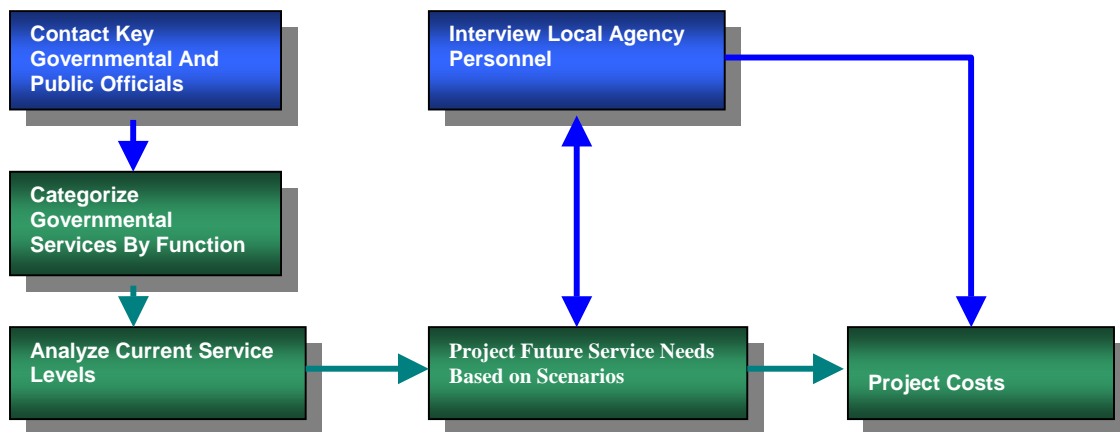


Fig. 1. Methodological approach

The case study fiscal impact analysis method was used for projecting fiscal cost to public safety agencies for each of the governmental entities in this study. The case study method “employs intensive site-specific investigations to determine categories of excess or slack in public service delivery capacity.” Excess capacity exists when there is capacity beyond that needed to accommodate existing service need or demand, and deficient capacity exists when the current capacity is below what is needed or near the limits of what can be provided. These deficient or excess service capacities are subtracted from or added to the projected estimates of operating and capital demands. Hence, excess existing capacity can actually mitigate the effects of a project on a community, as it may already possess the capacity to meet these future or projected service

needs and demands. Alternatively, should a community be at peak capacity or deficient capacity already exists, then additional demand may have far greater impact than an average cost technique would project. In fiscal impact analysis used by planners, when a new development results in, for example a new fire station, or rescue station, the new development may be charged for the entire cost. In a similar vein if a new project or mandate results in the necessity of new equipment, training, or various capital outlays, the relevant acts (NWPA, NWPAA) specify that the agent of these new costs be charged for the entire amount of the new capacity.

The case study methodology for estimating fiscal impacts was adopted for projecting fiscal costs to the governmental agencies in incorporated cities in Clark County. This methodology entails the following steps (also see Fig. 1).

1. Convene a meeting of city and tribal representatives (and their selected emergency service representative from their city) to the Clark County Nuclear Waste Division's (NWD) Advisory Committee to explain the purpose and methodology of the study and enlist their cooperation.
2. Contact and interview the city representative to the County Nuclear Waste Division's Advisory Committee to identify the likely city agencies that will be impacted.
3. Contact and interview these key governmental and public officials (emergency management, police, fire, budget, planning).
4. Categorize current local governmental services by function and the administrative agencies responsible for each (particular attention to each community's governmental organization is required at this stage);
5. Determine current levels of service provision, as well as existing service excess or deficiency for various public services;
6. Project future service needs and demands using existing mandates and agency responsibilities, as well as through the interviews conducted;
7. Interview local agency personnel to determine how their departments will respond to the scenarios characterizing the nature of the future repository and transportation of waste, and how these scenarios will either result in the necessity of expanded capacities (or not) and the projected response of the agency;
8. Estimate fiscal costs that will be incurred by each affected agency and the affected units of local government as a result of their projected response to the scenarios (needed training, equipment, operational expenditures, and capital outlays over the life cycle of the project).

Fig. 1 outlines the approach to projecting the fiscal impacts and it can be seen clearly that the process is iterative and non-linear. These steps are not linear as there are several contacts and interviews with agency personnel as the study progresses. Frequently, after an interview with agency personnel it is necessary to again interview that individual for clarification or draw on their expertise to adequately project the impacts of the project. Often interviews with agency staff members results in being referred to another member of an agency's personnel. In addition, in order to increase the comparability of the projections, interview schedules contained a basic set of questions that were developed and used for each informant interviewed. However as noted earlier, the scenarios used in this study differ substantially from those used in the 2001 studies.

Before reviewing these scenarios, an additional important observation needs to be made in concluding the discussion of the methodology. The methods utilized in this study are entirely consistent with those recommended and used by many communities participating in the Department of Homeland Security (DHS) Urban Areas Security Initiative Grant Program [16,

17]. Indeed, Clark County's participation in the DHS Urban Area Security Initiative, and their development of an urban area strategy, included a comprehensive risk and threat assessment (comparable to our development of scenarios that are discussed below). In addition, a group of experts representing the public safety agencies was put together to assess resources needed meet the risk and threats, as well as the cost of these needed training, equipment and personnel [18]. In short, the approach used to determine the cost of preparedness and prevention along with response and recovery for a CBRNE (Chemical, Biological, Radiological, Nuclear and Explosive) event used by Clark County and accepted by the DHS is entirely consistent with the approach we have utilized in this and similar studies projecting fiscal impacts on public safety agencies from the siting of a HLW Repository and transporting the waste to Yucca Mountain. These studies began in 1986.

The 2005 Study Scenarios

In all of the public safety agencies examined earlier in 2001, the current capacity was determined to be inadequate to respond to a major radiological incident or what was termed as a major reasonably foreseeable accident (MRFA). The three scenarios used in 2001 were based on the best available information at the time. The scenarios included information from both the DOE's Draft Environmental Impact Statement for the first two scenarios, as well as information from the State of Nevada's Nuclear Projects Office transportation expert for the third. The 2001 scenarios included a "benign" future shipping campaign beginning in 2007 entailing no accident of any kind. The second scenario used in 2001 involved an accident in which a cask containing HLW breaks free, but remains intact with no release of radiation. Finally, the third scenario entailed a serious accident in which radioactive waste materials are dispersed over a wide area. This third scenario became the MRFA for almost all of the public safety agencies involved in the 2001 series of community studies.

However, in February 2002 the DOE's Office of Civilian Radioactive Waste Management released the Final Environmental Impact Statement for Yucca Mountain outlining what it believed was the worst accident case. In order to maintain as close a tie as possible to the DOE's planning, this worst case was adopted into the current study as the MRFA. In past studies of the State of Nevada's public safety agencies, two trends were noted. First, over time, as more information became available, agency personnel became far more confident in their estimates of how the Yucca Mountain project would affect their agency. Second, the scenarios that were used play an important part in their planning for the project and thus their fiscal projections [10]. Hence, the question of how the new scenarios with a change in the MRFA would affect the impact projections was an important consideration in planning this study. Eventually, it was decided that the importance of aligning the scenarios as closely with the DOE's planning and analysis should be paramount in the fiscal impact analysis. In addition, it became clear that in addition to estimating the fiscal impact at one point in time (the estimated time shipping would begin), it also would provide more insight in the actual projected fiscal impacts by attempting to project these costs throughout the entire 24-year shipping campaign.

The new materials were discussed with public safety personnel, along with the new MRFA (discussed below). The two scenarios contained a mostly rail shipments and a mostly truck shipments scenario (see Fig. 2 and Fig. 3) based on the DOE Final Environmental Impact

Statement. The rail route map contained the 513 kilometer Calliente Corridor that DOE hopes will be constructed in order to by-pass the rail line through downtown Las Vegas (Fig. 3). In both, the mostly rail and mostly truck, scenarios there are shipments that will pass through Clark County's urbanized population beginning in 2010. A summary of the key details of the mostly truck scenario includes:

Shipments Planned Under Mostly Truck Scenario

Total number of legal-weight truck shipments over a 24-year shipping period:	52,786
Number of shipments per year	2,199
Number of shipments per week	42
Number of shipments per day	6

There are two principal shipment routes for these truck shipments

For 45,919 of the legal-weight shipments:

- **I-15 entering Clark County from Arizona via I-15 at Mesquite**
- **I-15 continuing on and traversing the Moapa Reservation to the**
- **Northern Beltway continuing on to**
- **U.S. 95 north traversing the Las Vegas Paiute Reservation to the repository**

For 6,867 of the legal-weight shipments:

- **I-15 entering Clark County from California at Primm to the**
- **Southern Beltway continuing on to**
- **U.S. 95 traversing the Las Vegas Paiute Reservation to the repository**

The potential trucking routes via Interstate 15 from the north and south end of the Las Vegas valley are further depicted in Fig. 2.

In addition, the mostly truck scenario contains 100-300 train shipments from INEEL in Idaho involving Multi Purpose Canisters that will be downloaded at an intermodal transfer facility, at or near Apex, onto heavy haul trucks. These trucks will be 200+ feet long vehicles and will be very slow moving. These vehicles will enter the I-15 at U.S. 93 or at State Route 604 (see Fig. 2) to the Northern Beltway and traverse the Las Vegas Paiute Reservation.

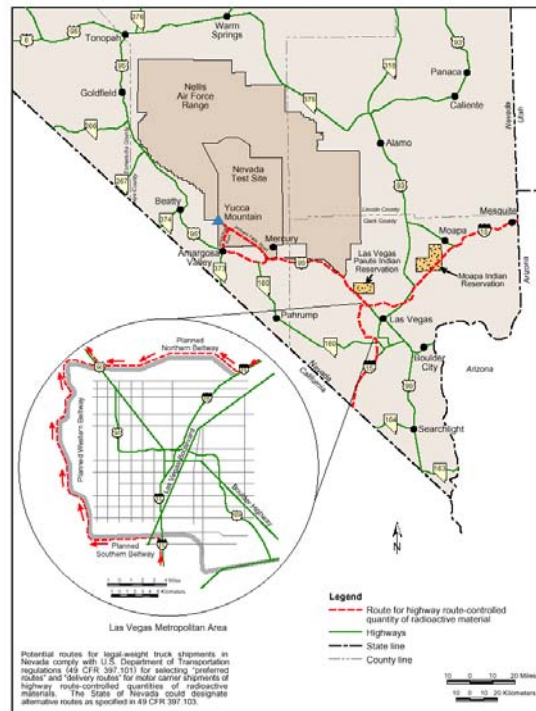


Fig. 2. Potential truck routes

Source: Hinze, D. 2005. Potential Nevada Routes for Legal Weight Truck Shipments of Spent Nuclear Fuel and High-Level Radioactive Waste. <http://www.landercountynwop.com/Maps/s-12.gif>, retrieved June 20th, 2005.

The major elements of the mostly rail shipments scenario includes:

Shipments Planned Under the Mostly Rail Scenario

Total number of rail shipments through Clark County over a 24-year shipping period	194-594
Total number of rail cask shipments that would not travel through Clark County	8,896-9,052

Principal Rail Shipment Routes

For the roughly 594 rail cask shipments:

- **Enter Clark County from CA. on the Union Pacific Main Line and**
- **Traverse Downtown Las Vegas and**
- **Travel to the Caliente Rail Spur Traversing the Moapa Indian Reservation**

Under the mostly rail shipment scenario there are approximately 1,079 legal-weight truck shipments into Clark County.

The shipment plan for these 1,079 legal-weight trucks:

- **I-15 entering Clark County from Arizona via I-15 at Mesquite**
- **I-15 continuing on and traversing the Moapa Reservation to the**
- **Northern Beltway continuing on to**
- **U.S. 95 traversing the Las Vegas Paiute Reservation to the repository**

The map for the rail shipments is found in Fig. 3.

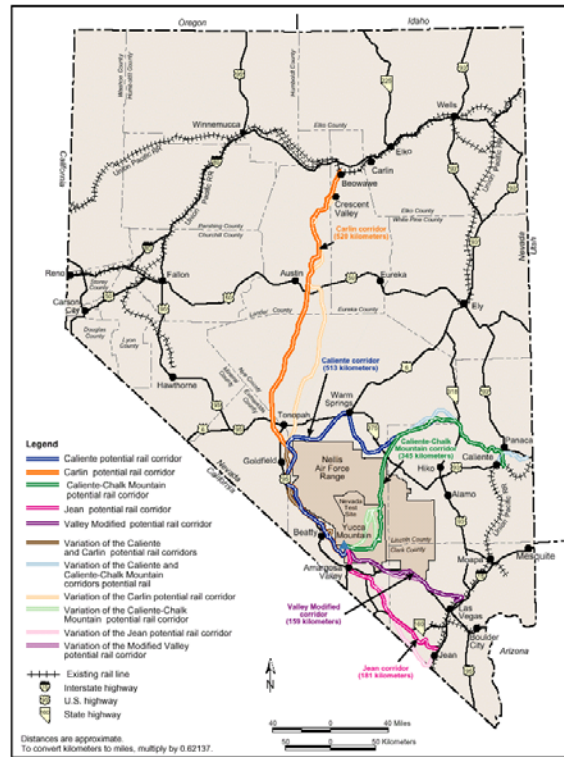


Fig. 3. Potential rail routes

Source: Hinze, D. 2005. Potential Nevada Rail Routes Yucca Mountain <http://www.landercountynwop.com/Maps/s-26.gif>. retrieved June 20th, 2005.

In addition, the public safety personnel were provided with a discussion of the accident rates projected by both the DOE [19] as well as accident rates estimated by the transportation consultant to the Nevada Nuclear Projects Office. These estimates are provided in Table I. While accident rates are important, most of the public safety personnel in the study were focused on the MRFA [19].

Table I. Accident Estimates

Scenario	DOE Estimate	State Estimate Using DOE Data	State of NV Estimate
Mostly Truck	66 Truck	5-6 in NV	75 total
	0-1 Rail		
Mostly Rail	8 Rail	1 in NV	190 total and
	1 Truck		
Most likely MRFA for both rail and truck is a long duration high-temperature fire that would engulf a cask (similar to the Baltimore Tunnel Fire). MRFA is most likely in a rural area.			

The most likely MRFA for both rail and truck, according to the DOE's FEIS is a long duration high-temperature fire that would engulf a cask. While the DOE's analysis suggests that such an MRFA is highly unlikely, it can not be ruled out. The Baltimore Tunnel fire that occurred July

18, 2001 involved a CSX freight train, which partially derailed in the Howard Street Tunnel. Four of the cars that derailed were tankers carrying flammable and hazardous chemicals. A fire ensued when one of the tankers ruptured. It created an inferno that engulfed the tunnel and paralyzed the downtown area for several days (Associated Press, April 13, 2005:3). The MRFA with a similar scenario became what the "CCFD must be prepared to handle" in planning for their needs [20].

Before discussing the specific cost projections for each of the governmental agencies and entities, an examination of the process used by the CCFD will be instructive. Obviously, not all of the public agencies used such a detailed planning process in attempting to identify potential impacts. Yet, the process used by the CCFD is instructive in demonstrating why the methodology employed over time results in increasing the reliability of both the projected potential impacts, as well as the associated fiscal costs. The CCFD projections are scrutinized and more detailed information about the transportation of HLW becomes available. Finally, the CCFD effort allows us to see just how seriously agency personnel in the study treat the exercise and how iterative a process it becomes as it expands in scope and additional agency resources and personnel become involved.

The CCFD formed a task force consisting of 9 members of the department and a representative from the Metropolitan Police Department. This task force met over 6 times between December 2004 and April 2005. Space does not permit a detailed discussion of the CCFD processes. However, during these meetings, and other meetings within the CCFD of the potentially affected personnel, the initial fiscal projections were scrutinized through an iterative process that continued to expand as it required additional agency personnel and resources.

The Model and Questionnaire

The development of a questionnaire that can be used in obtaining fiscal impact projections in the future was developed for the project. The questionnaire consists of items concerning future needs in personnel, capital equipment, training, as well as the entire range of needs identified by fire departments, police departments and emergency management agencies (the pull down questionnaire is available upon request). Once a box has been checked, the drop down populates the need area. For example, if an additional station is needed and the box checked, the drop down populates the station with personnel and equipment based on past experience and solicits from the respondent any additional needs or to identify specific items that might not be needed by the entity. In this way, the per unit costs can be standardized across jurisdictions and any idiosyncratic needs identified. The questionnaire and accompanying per unit cost charts for fire, police and emergency management are available upon request.

In addition to the questionnaire development, an Excel model was developed that captures all of the per unit cost for each item estimated by a public service agency. Using this model, agencies may alter their projections in a very simple fashion by using the questionnaire and the information being entered into the model.

THE FISCAL COST PROJECTIONS

There are two types of projections that are provided in this section of the report. The first projection entails cost estimates for the fiscal impacts on the public safety agencies directly attributable to the shipping of HLW to the Repository beginning in 2010. These current projections, are put into 2010 dollars, and are based on the public safety agencies' efforts to identify the equipment, capital infrastructure, training and other upgrades to their capacity necessary for them to be prepared for an MRFA involving HLW. The second type of projection is for the fiscal cost of these agency requirements for the entire 24-year period of the transportation campaign. It is essential that in the 24-year projections the useful life of equipment, vehicles, and capital infrastructure be accounted for so that the projections do not underestimate or overestimate the impacts. For example, vehicles, and equipment will not be useable for the entire 24-year period. Hence, these fiscal cost projections must factor in the useable life of such equipment, the inflationary rise in cost, and build their repurchase into the estimates. Using Microsoft Excel, models were developed, with the assistance of Jeremy Aguero of Applied Analysis, of both useful life and inflationary costs were constructed for all of the items affected by these factors. The useful life schedule from the base year at specific intervals (year 5, 10, 15, 20 and 24) are available from the authors upon request as the space permitted do not allow for their attachment to this paper. In addition, it was necessary to develop cost inflation percentages projected for the same five points in time and over the 24 year shipping period. These schedules are also available from the authors.

The current fiscal impact projections are provided in FY 2010 dollars. However the model permits us to estimate these costs beginning at any point in time including the projected beginning of the shipping campaign 2010. The 2001 fiscal cost estimates were based on 2007 dollars. The current projections or the base case fiscal projections for Clark County and local jurisdictions are provided.

Fire Department Projections

Table II provides the base case estimates for the Clark County Fire Department. Table II serves as an example of what was done for each fire department in each of the five jurisdictions examined. The CCFD projected cost for the impacts identified totals \$244,246,123. In 2001 the CCFD estimated a cost of \$195,896,055 from the repository and the shipping of HLW. On the surface it appears that the CCFD estimate has grown by 24.6% from 2001 to 2005. However, the CCFD identified the need for a Regional Training Center (RTC) at Apex or Jean in their assessment that was not identified in 2001. If the current cost of the land for the RTC (\$78+ million) is removed the estimate for 2005, it results in a total estimated impact of \$165,838,123 or roughly \$30 million less than the 2001 estimate. Therefore, the projected fiscal impact of preparing for the MRFA is lower in 2005 except for the additional land necessary for the RTC. Yet, given the additional attention to estimating these impacts in 2005 through the Task Force that was organized, as well as the additional information available now concerning the MRFA and transportation, the current projections need to include fewer possible exigencies than was the case in 2001. In short, the estimates are expected too narrow, although not necessarily decline. In this case, CCFD's estimates did decline but the identification of the needed RTC results in an increase in the total fiscal impact.

Table II. Projected Fiscal Costs on the Clark County Fire Department (2010 Base Case)

CAPITAL COSTS	Base	Total
Capital Construction Costs	\$160,782,050	
Apparatus and Related Equipment Acquisition Costs	\$27,609,484	
Support Equipment Capital Costs	\$283,421	
Air Support Capital Equipment Costs	\$964,431	
Support Vehicle Capital Costs	\$3,409,751	
Communication Capital Equipment Costs	\$1,254,919	
TOTAL CAPITAL COSTS		\$194,304,056
OPERATIONS & MAINTENANCE COSTS		
Routine Operations & Maintenance	\$2,369,864	
Personnel Costs	\$33,914,406	
Personnel Training Costs	\$9,928,907	
Communications System Costs	\$47,091	
Administrative & Planning Costs		
Miscellaneous Operations & Maintenance	\$3,681,799	
TOTAL FIRE OPERATIONS & MAINTENANCE		\$49,942,067
TOTAL FIRE FISCAL IMPACT		\$244,246,123

Table III provides a summary of the various entities fire departments' current fiscal projections for the impacts. As can be seen from the table the current base case dollar estimates totals \$331,038,970. In 2001, the fire departments estimated projections totaled \$267,351,634. The 2005 estimate is \$63,787,336 more than it was in 2001 or an increase of almost 27%. The increase is largely a function of the land cost for the Regional Training Center (\$78 million) in the CCFD impact estimates. In short, the fiscal projections in the fire departments, using far more personnel in estimating impacts and with more current data concerning routes and the possible MRFA is converging.

Table III. Summary Current Fire Impact Projections (2010 Base Case)

Fire Entity	Total Fire Fiscal Impact
Clark County Fire Department	\$244,246,123
City of Las Vegas Fire & Rescue Department	\$51,561,334
North Las Vegas Fire Department	\$29,920,000
Henderson Fire Department	\$159,764
Mesquite Fire Department	\$5,151,749
TOTAL FIRE FISCAL IMPACT	\$331,038,970

Table IV provides a summary of the 24-year fiscal cost projections based on the fire departments' estimates and it includes inflationary factors and useful life span of equipment and other capital expenditures. The table contains the first effort at projecting out the costs from the 24-year shipping campaign on any public safety agencies. As can be seen from Table IV, for just these fire departments, a total of \$3,053,423,989 is the projected fiscal impact on these fire

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departments. This \$3+ billion represents projected costs that none of the departments would incur if not for the repository siting and the accompanying shipping campaign of HLW.

Table IV. 24-Year Projected Fiscal Fire Departments

Agency	Projected (24-year)	Subtotal
Clark County Fire Department Total Capital Costs	\$335,007,656	
Clark County Fire Department Total Operations & Maint.	\$1,723,605,625	
SUBTOTAL CLARK COUNTRY FIRE DEPT		\$2,058,613,281
City of Las Vegas Total Capital Costs	\$75,302,636	
City of Las Vegas Total Fire- Operations & Maintenance	\$451,637,492	
SUBTOTAL CITY OF LAS VEGAS FIRE & RESCUE		\$526,940,128
NLV Total Capital Costs	\$37,750,509	
NLV Total Fires Operations & Maintenance	\$272,796,577	
SUBTOTAL NORTH LAS VEGAS FIRE		\$310,547,086
Henderson Total Capital Costs		
Henderson Total Fire-Operations & Maintenance	\$6,243,993	
SUBTOTAL HENDERSON FIRE		\$6,243,993
Mesquite Total Capital Costs	\$6,662,617	
Mesquite Total Fire -Operations & Maintenance	\$144,416,884	
SUBTOTAL MESQUITE FIRE		\$151,079,501
TOTAL PROJECTED FIRE DEPT COSTS		\$3,053,423,989

Police Department Projections

The 2001 fiscal cost projections for METRO relied heavily on the work of one officer in charge of emergency management for METRO. In 2005, METRO decided to expand the team responsible for developing their impact projections. The estimates that were provided is largely the work of a team in the Office of Quality Assurance in METRO. However, the four individuals in Quality Assurance drew upon the expertise of at least eight other METRO personnel representing personnel, payroll, emergency management, budget, fleet management, supply management and the Rapid Assessment Team. Similar to what took place in the CCFD, the number of individuals and the fields of expertise represented were expanded dramatically from 2001.

Table V provides the base case estimates of fiscal impacts to METRO. Table V also serves as an example of what was done for each police agency in the 5 jurisdictions for the base case. The projected impacts in 2010 dollars total \$31,610,989. The 2001 projection was \$67,686,369. The reduction of \$36+ million in projected impacts is largely the result of different working assumptions and the removal of additional substations. In addition, the issue of escorting shipments will need clarification for METRO to be more specific about some of its equipment and personnel needs. For example, the question of which agency METRO, the Nevada Highway Patrol or another police agency will have the responsibility of escorting truck shipments will have a major effect on some of the projections. Also in need of clarification, is whether the DOE

uses the primarily rail or truck shipment scenario as mode of shipments will heavily affect the escorting vehicles required.

Table V. Las Vegas Metropolitan Police Department Base

CAPITAL COSTS	Base
Support Vehicles	\$585,839
Haz Mat Radiological	\$1808468
Air Support	\$7419354
Other Equipment	\$9366726
TOTAL CAPITAL COSTS	\$19,180,387
OPERATIONS & MAINTENANCE COSTS	
Personnel Costs	\$4801926
Personnel Training Costs	\$5025459
Maintenance and Supply Costs	\$2602259
Haz Mat Emergency Administration	\$958
TOTAL OPERATIONS & MAINTENANCE COSTS	\$12,430,602
TOTAL POLICE IMPACT	\$31,610,989

The base case and projected 24-year campaign figures for police departments are shown in Table VI. The base case total for police departments is **\$92,072,753**. The projected 24-year entire shipping campaign costs to police agencies participating in the study are projected to have fiscal impacts totaling **\$516,592,217**. Of this total, \$394,323,975 is projected just for METRO or about 76% of the total projected fiscal impacts on police departments during the 24-year shipping campaign.

Table VI. Police Departments 24-Year Projected Fiscal Costs

Agency	Base	Projected (24-year)
Clark County METRO Capital Costs	\$19,180,387	\$61,720,070
Clark County Operations & Maintenance	\$31,610,989	\$332,603,905
SUBTOTAL CLARK COUNTY	\$31,610,989	\$394,323,975
City of Las Vegas Capital Costs		
City of Las Vegas Operations & Maintenance		
SUBTOTAL CITY OF LAS VEGAS		
City of North Las Vegas Capital Costs	\$495,022	\$2,081,175
City of North Las Vegas Operations & Maintenance	\$216,000	\$7,425,452
SUBTOTAL CITY OF NORTH LAS VEGAS	\$711,022	\$9,506,627
Henderson Capital Costs	\$77,677	\$535,354
Henderson Operations & Maintenance	\$418,193	\$14,425,354
SUBTOTAL HENDERSON	\$495,870	\$14,960,709
Mesquite Capital Costs	\$917,760	\$3,858,457
Mesquite Operations & Maintenance	\$2,710,542	\$93,942,449
SUBTOTAL MESQUITE	\$3,628,302	\$97,800,906

TOTAL PROJECTED POLICE DEPT COSTS	\$92,072,753	\$516,592,217
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Emergency Management

Table VII provides the base case estimates for the emergency management functions in the local jurisdictions and the first estimates of the cost of constructing and operating a Regional Emergency Operations Center (REOC). The REOC has been placed within the Clark County Office of Emergency Management rather than a local jurisdiction reflecting the regional nature and function of such a center. It is important to note that all of the emergency management personnel from the agencies interviewed indicated the need for such a facility in the event of an MFRA, or a long lasting radiological event. The initial cost projections for such a REOC varied considerably among the jurisdictions, and the City of Las Vegas estimates are used here because of their comprehensive nature. As can be seen from Table XIV, the estimate of the REOC is \$15,472,500. The 2001 projections did not include such a facility.

The base case estimate for all jurisdictions is \$17,760,364. This base case estimate includes the Regional EOC that was not included in the 2001 estimates. The other large increase from the 2001 estimates for emergency management is a result of the City of Las Vegas estimates which are better grounded now as they have an experienced emergency manager in place in 2005 which was not the case during the 2001 study. In addition, much of the newly estimated impact in the City of Las Vegas is directly attributable to the need for new radiation, response plans, as well as public information programs.

Table VII also provides the 24-year projected fiscal impacts for the County and the local jurisdictions. As can be seen from the table, the total 24 projected cost for emergency management is \$376,455,465. These projected costs are the direct result from the siting of a repository and the anticipated shipping campaign.

Table VII. Emergency Management Costs (2010 Base Case & 24-year Projected)

	BaseCase	Projected 24- Year
Clark County Office of Emergency Mgmt		
Regional EOC CONSTRUCTION (15,000 sq. ft facility, Communication infrastructure, Land acquisition)	\$13,250,000	
Routine Operations & Maintenance	\$250,000	
Personnel Costs	\$1,472,500	
Miscellaneous Operations & Maintenance	\$500,000	
TOTAL OPERATIONS & MAINTEN COSTS	\$15,472,500	\$100,111,088
City of Las Vegas		
Personnel Training	\$116,000	
Emergency Response Administration	\$1,762,000	
TOTAL OPERATIONS & MAINTEN COSTS	\$1,878,000	\$36,355,329
City of North Las Vegas		
Routine Operations and Maintenance	\$200,000	
Personnel	\$110,000	
Emergency Response Administration	\$15,000	
TOTAL OPERATIONS & MAINTEN COSTS	\$325,000	\$12,186,992

Table VII. Con't	BaseCase	Projected 24- Year
Henderson		
Emergency Response Administration	\$74,864	
TOTAL OPERATIONS & MAINTEN COSTS	\$74,864	\$664,309
Mesquite		
Emergency Response Administration	\$10,000	
TOTAL OPERATIONS & MAINTENANCE	\$10,000	\$47,590
COMBINED TOTAL	\$17,760,364	\$376,455,465

Summary of Projected Costs

Table VII provides a summary of the base case costs by community and function. The table permits one to see the total base case estimated fiscal cost projections for Clark County and each community, as well as the total estimated cost for each public safety function. For example, base case fire department projected costs are \$331,038,969 of the total projected public safety cost estimated at \$385,245,516. This total for fire represents almost 86 percent of the total projected base case cost.

Table VIII. Total Projected Costs for Clark County and Local Jurisdictions (Base Case 2010)

	Fire	Police *	Emergency Mgmt	Total Costs
Clark County	\$244,246,123	\$31,610,989*	\$15,472,500	\$291,329,612
Las Vegas	\$51,561,333	*	\$1,878,000	\$53,439,333
North Las Vegas	\$29,920,000	\$711,022	\$325,000	\$30,956,022
Henderson	\$159,764	\$495,870	\$74,864	\$730,498
Mesquite	\$5,151,749	\$3,628,302	\$10,000	\$8,790,051
COMBINED TOTALS	\$331,038,969	\$36,446,183	\$17,760,364	\$385,245,516

* Police refers to the Las Vegas Metropolitan Police Department (METRO) which is a jointly funded police force by Clark County and the City of Las Vegas. The projections for METRO have all been placed under Clark County projections

Table IX provides the total projected 24-year cost for Clark County and the local communities by public safety function. Of the total projected \$3,719,031,513, CCFD projections equal over \$2 billion of this total. Fire Departments' total projected fiscal cost estimates total over \$3 billion of the estimated \$3.7 billion. Indeed, Clark County, including METRO account for over \$2.5 billion of the more than \$3.7 billion projected during the 24-year shipping campaign. These projected costs to public safety agencies resulting from the siting of the repository and 24-year anticipated shipping campaign represents the potential for significant unfunded mandates and the County and communities will need to continue to plan for their impact.

Table IX. Public Safety Projected Fiscal Impacts for Clark County and Local Jurisdictions at 2010 and for 24-year Shipping Campaign

		2010 Base Case**	24-year Totals
Clark County	Fire	\$244,246,123	\$2,058,613,280
	Police*	\$31,610,989	\$394,323,975

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	Emergency Management	\$15,472,500	\$100,111,088
Total		\$291,329,612	\$2,553,048,343
City of Las Vegas	Fire	\$51,561,333	\$526,590,127
	Police*		
	Emergency Management	\$1,878,000	\$36,355,329
Total		\$53,439,333	\$562,945,456
North Las Vegas	Fire	\$29,920,000	\$310,547,085
	Police	\$711,022	\$9,506,627
	Emergency Management	\$325,000	\$12,186,992
Total		\$30,956,022	\$332,240,705
Henderson	Fire	\$159,764	\$6,243,993
	Police	\$495,870	\$14,960,709
	Emergency Management	\$74,864	\$664,309
Total		\$730,498	\$21,869,011
Mesquite	Fire	\$5,151,749	\$151,079,502
	Police	\$3,628,302	\$97,800,906
	Emergency Management	\$10,000	\$47,590
Total		\$8,790,051	\$248,927,998
Combined Total		\$385,245,516	\$3,719,031,513

* Police refers to the Las Vegas Metropolitan Police Department (METRO) which is a jointly funded police force by Clark County and the City of Las Vegas. The projections for METRO have all been placed under Clark County projections

**Base case is the cost incurred for shipping to commence.

CONCLUSIONS AND NEXT STEPS

The projected public safety impacts resulting from the DOE's proposal to ship high-level nuclear waste to Yucca Mountain will result in a significant fiscal burden to Clark County and local jurisdictions. While the Nuclear Waste Policy Act requires the DOE to assist affected units of local government with public safety related impact costs it is not likely that DOE will provide adequate compensation for these impacts. While DOE continues to move forward with transportation planning for the proposed Caliente rail corridor, the likelihood that they will be successful in implementing rail routes in the early stages of the proposed shipment campaign is questionable. Therefore, Clark County has continued to be prepared for highway shipments during the initial years of the proposed Yucca Mountain high-level nuclear waste shipment program. Furthermore, even if the DOE is eventually successful in implementing rail shipments along the Caliente rail corridor, Clark County will continue to be affected and be responsible for public safety impacts.

Thus, it is critical that Clark County continue to update their impact assessment costs on an annual basis and to continue to provide these costs to the DOE and other federal, state, and local decision makers. In addition, it is vital that Clark County continues to monitor the full range of potential public safety impacts to document Yucca Mountain related impacts for federal, state,

and local decision makers. The methodology and projections presented in this paper provide the most recent efforts at utilizing a mature methodology to provide estimates of these potential impacts to public safety agencies.

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