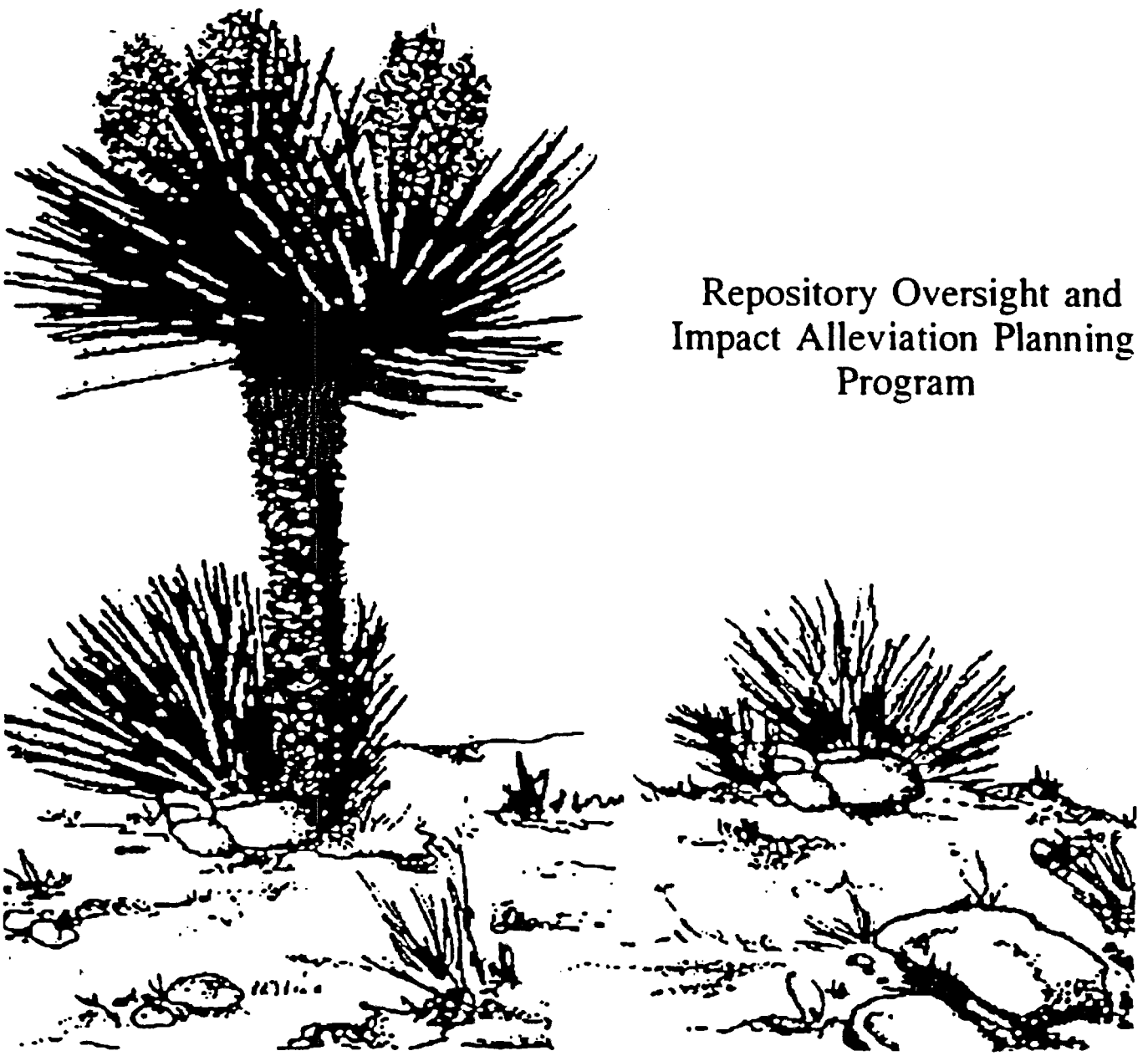
Lincoln County/City of Caliente

Repository EIS Scoping Report:

Issues Identified by Lincoln County and
the City of Caliente Needing to be
Addressed Within the Repository EIS



Repository Oversight and
Impact Alleviation Planning
Program

Main / Legacy - no

Repository EIS Scoping Report:

Issues Identified by Lincoln County and the City of Caliente Needing to be Addressed Within the Repository EIS

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December 5, 1995

December 5, 1995

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Yucca Mountain Site Characterization Office
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RE: Submission of Written Comments to the Scope of the Repository EIS

Dear Ms. Dixon:

On behalf of Lincoln County and the City of Caliente, Nevada, we are pleased to submit this report documenting issues which the County and City believe must be substantively addressed within the repository EIS. This report supplements verbal comments which were provided to DOE by the County and City at the repository EIS scoping meeting held September 25 in Caliente.

The Board of Lincoln County Commissioners and the Caliente City Council expect DOE to give thorough consideration of all issues on EIS preparation process and scope documented within this report. The County will not hesitate to pursue all avenues afforded by federal and state law to ensure that repository impact issues important locally are fully addressed within the EIS and subsequent Record of Decision. DOE is encouraged to err on the side of inclusion rather than exclusion in determining the scope of the EIS to be prepared for the proposed repository at Yucca Mountain.

We trust that the contents of this EIS scoping report will serve to assist DOE in determining the scope of the repository environmental impact statement. Please feel free to contact us should you have any questions regarding the issues raised within this document.

Sincerely,

Edward E. Wright, Chairman
Board of Lincoln County Commissioners

Kevin Phillips, Mayor
City of Caliente

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1.0 INTRODUCTION

1.1 Purpose of This Report

In submitting this document, Lincoln County and the City of Caliente are identifying and substantiating the importance of various priority impact issues which must be considered within the scope of the repository environmental impact statement (EIS). The Council On Environmental Quality (CEQ) has indicated that every issue that is raised as a priority issue during scoping should be addressed in some manner in the EIS.[1] It will be up to DOE to conclude whether issues raised by the County and City are to be addressed in the EIS by in-depth analysis or through a short explanation showing that the issue was examined, but was not considered significant for one or more reasons. Reviewers of this report will immediately note the comprehensive nature with which the various identified issues are treated. The intent of the County and City is clear. Each intends to establish in the administrative record for the repository EIS that the jurisdictions did identify and validate the importance of the impact issues addressed within this document. In the event that the County and/or City conclude that the draft of the repository EIS provides insufficient treatment of one or more issues raised herein, this document will assist in verifying the relevance of contested issues raised in a timely fashion. This report has been organized in a manner consistent with the likely content of the repository EIS. Preparation of the document in this manner should facilitate Department of Energy consideration of various issues raised herein.

1.2 Status As An Affected Unit of Local Government

Lincoln County is one of ten units of local government which have been designated by the Secretary of Energy as an "affected unit of local government" pursuant to the Nuclear Waste Policy Act, as amended. The County is one of only three counties which the Secretary of Energy voluntarily designated as affected by repository activities. What was identified in the 1986 Yucca Mountain environmental assessment remains true today: Lincoln County is likely to serve as the gateway for most shipments of high-level radioactive wastes entering Nevada and destined for storage and disposal at the Nevada Test Site. More recently, it has become evident that mutual interests of the State of Nevada and DOE to minimize risks to the health and safety of a majority of Nevada's residents and economy of southern Nevada will likely shift said risks to residents and businesses of Lincoln and other rural counties. Such risk minimization objectives have been translated into proposed federal legislation now pending before Congress. In response to efforts by the State of Nevada and DOE to defer risks away from Nevada's populated areas, the Board of Lincoln County Commissioners has and will continue to respond with recommendations focused at risk minimization and benefit maximization locally. Lincoln County expects DOE's repository EIS to fully address measures to mitigate risks.

1.3 Activities Leading To Preparation Of This Report

Preparation of and submission by Lincoln County and the City of Caliente of this EIS scoping report does not represent another uninformed "not-in-my-backward" reaction to a federal Notice-of-Intent. To the contrary, this document reflects well informed and carefully considered reactions to DOE's proposal to dispose of nuclear waste at Yucca Mountain. The ability of the County and City to provide DOE with the level of quality input by which this document can be characterized is incumbent upon the lengthy involvement of concerned citizens, independent local research, and prior experience with DOE NEPA compliance activities.

1.3.1 Joint City/County Impact Alleviation Committee - For the past ten years, Lincoln County and the City of Caliente have conducted a joint repository oversight and impact alleviation planning program. Through a memorandum of understanding, the County and City have established the Joint City/County Impact Alleviation Committee (JCCIAC) to oversee repository oversight and independent impact assessment activities. During this period, the eight-member JCCIAC Committee has diligently sought to provide guidance to local repository programs. The Committee, representing both geographic and disciplinary diversity, has met no less than 60 times and has invested over 1,000 hours of largely volunteer time to understand the implications of the Nation's nuclear waste management program to Lincoln County.

1.3.2 Independent Research - Utilizing funding provided by the DOE, the Committee has overseen the preparation of over 45 reports documenting repository system implications for Lincoln County. Topics addressed within these studies include emergency response, ethnography, transportation routing, economic/demographic impact assessment, media amplification of risks, community development, transportation risk assessment, risk communication, tourism impact assessment, fiscal impact assessment, and risk perception, among others. The numerous studies sponsored by the County and City of Caliente have utilized teams of highly trained and competent researchers representing both academic and private entities. In addition, the State of Nevada Nuclear Waste Projects Office has conducted numerous studies which directly or indirectly address repository implications within Lincoln County and the City of Caliente. The County and City have developed a summary compilation of all findings of the State of Nevada with regard to repository system impacts locally. The extensive information base represented by these various studies has been thoroughly utilized in preparing this scoping report. Section 8 of this report includes an exhaustive list of references resulting from the joint County/City repository oversight program. DOE is encouraged to make liberal use of this same body of information in preparing the repository EIS.

1.3.3 Input to Previous DOE EIS Scoping Processes - Ten years ago, Lincoln County

and the City of Caliente provided DOE with verbal and written comments to the draft environmental assessment of the Yucca Mountain site, Nevada Research and Development Area.[2] The concerns raised by the County and City in February of 1985 remain equally valid today. Chief among issues brought to DOE's attention was the fact that the environmental assessment failed to adequately consider the propensity of the repository program to impact the County and City. During 1985, DOE appeared far more concerned about the potential for a few thousand repository workers to impact Clark County's population of several hundred thousand. Lincoln County and the City of Caliente successfully demonstrated the relative importance of 150 new residents in a County having a few thousand residents as compared to a few thousand workers impacting a community of several thousand persons. The County and City remain concerned today that DOE will tend to pay more attention to impacts measured in absolute magnitude rather than in relative terms. DOE is encouraged to remember that a community's ability to contend with an affect depends to a large degree to the relative change which will result.

More recently, the County and City have provided extensive input to DOE on the scope of the Sitewide EIS for the Nevada Test Site and the Multi-Purpose Canister EIS.[3,4] Each of these NEPA compliance activities address transportation of spent nuclear fuel and/or other high-level radioactive wastes. In each case, comments submitted by the County and City reflect concern that the consequences of the environment upon safe transport be considered. In addition, DOE was asked in each case to make a draft of the subsequent EIS implementation plan for each topic available to stakeholders for review and comment. The County and City also expressed concern in each case over the relationship of decisions involving shipping containers and routing of LLRW as factors influencing decisions about shipments of spent nuclear fuel and other high-level wastes. Issues raised in each of these previous cases remain largely relevant to the current repository EIS. DOE is encouraged to consider the comments of the County and City to these previous EA/EIS's in considering the scope of the repository EIS. The experience of Lincoln County and the City of Caliente with DOE NEPA compliance activities and the repository program in general heightens the value of scoping input received from these entities. DOE should consider the potential for County and City input to the scope of the repository EIS to strengthen the sufficiency of the draft EIS.

2.0 Alternatives To Be Considered

The alternatives section of the repository EIS will be critical to the documents' ultimate utility as an effective decision support document. The definition of alternatives to be considered within the EIS should be in part focused at aiding DOE and congressional decision-makers in evaluating comparative benefits and costs of proceeding with the waste management program now authorized by federal law. DOE should not be

constrained by definition of alternatives which fall wholly within the confines of existing law. Rather, consideration of alternatives that are outside the scope of what Congress has apprcved or authorized can and should be evaluated in the EIS as the EIS may serve as a the basis for framing subsequent Congressional decisions.[5] In this regard, the repository EIS might consider alternatives defined by legislation currently pending before Congress. For example, interim storage at Area 25 of the Nevada Test Site and related transportation modal and routing should be addressed within the repository EIS. This alternative could then be compared by decision-makers with at-reactor storage (the No Action alternative) as well as repository development. In addition, various DOE environmental impact statements have recently suggested that NTS be utilized to dispose of extensive volummes of low-level radioactive wastes generated at defense sites around the United States. Most, if not all of this waste will also be shipped through Lincoln County, perhaps utilizing the very same transportation infrastructure developed for high-level waste. The development of this infrastructure may result in LLRW shipments through Lincoln County. As a consequence, the implications to the County of these added shipments should be considered in the repository EIS.

Within the confines of existing authorizing law, the repository EIS should consider alternatives for accomplishing each major facet of the waste management system. These include the repository itself, rail transportation within Nevada, legal weight truck transport within Nevada, heavy-haul truck transport through Nevada, and intermodal transfer from rail to truck within Nevada. The emphasis upon impacts within Nevada should not be overlooked. Although the repository EIS is national in its geographic scope, there can be no doubt that impacts of the DOE waste management program will be most heavily concentrated in Nevada. As a consequence, the evaluation of impacts as they may occur in Nevada should be of sufficient detail commensurate with the need to fully understand repository system implications and related mitigation options.

Lincoln County and the City of Caliente recognize that the introduction of a myriad of alternatives to DOE's decision matrix adds several degrees of significance to the complexity of the decision process itself. However, the range of alternatives described within the Notice of Intent for the repository EIS is simply to narrow to empower decision-makers with the breadth of information needed to adequately conclude repository matters. Lincoln County and the City of Caliente recommend that DOE adopt a decision hierarchy within wnich alternative methods of achieving various components of the repository program and system can be thoroughly evaluated and compared. The hierarchy should recognize that certain decisions are at the base of the repository program and that others are dependent upon conclusions about base level issues. The County and City suggest that DOE propose such a hierarchy within a draft of the EIS implementation plan.

2.1 Repository

Lincoln County is located downwind of the Nevada Test Site (NTS). Residents of the County have historically been exposed to radioisotopes deposited in the area following above and below-ground nuclear weapons tests at NTS. Ethnographic studies of County residents reveal a pattern of real and potential exposures to radiation hazards by those who participated in outdoor activities during or immediately following such tests. Throughout DOE's history of weapons testing at NTS, much of Lincoln County was designated as an "Offsite Uncontrollable Area", meaning that in the event of an unanticipated atmospheric venting of radionuclides, communities within this area could not be effectively evacuated to ensure protection from exposure. The legacy of County residents having lived with these risks, is evidenced today by a concern by many residents about continuing and future exposure risks from DOE activities at NTS. Whether real or perceived, risks to area residents can result in adverse social and economic consequences.

The disposal of radioactive waste in a deep geologic repository at Yucca Mountain is characterized by both real and perceived risk. From the perspective of Lincoln County residents, the risk of exposure to radiation from atmospheric pathways is an important issue relating to the repository. In this regard, volcanism and criticality control are two issues which the County believes every aspect of repository development and operation must be evaluated against. The repository EIS must include a comparative evaluation of the extent to which alternatives for accomplishing construction, emplacement, closure, and post-closure phases of the facility achieve containment of radioisotopes during volcanic eruption and loss of criticality control.

There exist a myriad of alternatives for developing and operating a deep geologic repository at the Yucca Mountain site. Each alternative can be defined by unique risk management and cost characteristics. In addition, alternatives for establishing a repository are characterized by varying levels of uncertainty as to the certainty of their performance. The repository EIS must consider the full range of alternatives for construction, emplacement, Retrievability, closure, and post-closure. Selection of alternatives should be purposed at encompassing the possible risk management/cost benefits landscape. The comparative evaluation of alternatives for accomplishing deep geologic disposal should also capture the range of uncertainty attendant to such options. In this way, the EIS should facilitate decision-making under conditions of uncertainty.

2.1.1 Construction - In addition to the thermal loading alternatives described within the repository EIS Notice of Intent, other variations regarding repository construction should be considered. One set of alternatives might include variations in dependence upon natural versus engineered barriers to achieve containment of radionuclides. A heavy

emphasis upon engineered barriers might be costly but may reduce operational uncertainty. Alternatives for constructing the repository might also include displacement from geologic features such as faults and fracture zones. Achievement of greater distance from such features might reduce repository capacity but may also reduce performance uncertainty. Alternatives for repository constriction might also include variations in level of construction effort. For example, use of one versus two tunnel boring machines might be considered as such may relate to construction schedules, repository capacity, cost and socioeconomic impact. Additionally, the EIS should consider the risk management benefits and costs of the use of alternative construction materials.

2.1.2 Emplacement - Alternatives for accomplishing the waste emplacement phase of the repository should also be considered. Perhaps most important will be the evaluation of various candidate materials from which waste packages might be fabricated. Options which DOE might consider include those characterized as corrosion resistant, corrosion allowance, and moderately corrosion resistant. Each option will perform differently under alternative thermal and geochemical environments. Each alternative can be characterized by varying contributions to risk management, cost and uncertainty. In addition, the EIS should consider alternative materials for fabrication of waste package baskets. This is particular important given the role that choice of candidate materials will have on auto criticality control. Alternatives which might be considered in the EIS include borated materials, alloyed materials, ceramic materials or one or more combinations of these.

Emplacement alternatives considered should also include a comparative analysis between vertical and horizontal configurations. Factors against which these alternatives might be considered include ease of emplacement, effects upon corrosion rates, repository capacity, autocriticality control, and within canister gas dissipation rates.

2.1.3 Retrievability - Pre-closure monitoring of repository conditions may reveal deficiencies in performance. Alternatively, future generations may conclude that spent nuclear fuel and/or other high-level radioactive wastes have exploitable residual industrial values. Either scenario may lead to a subsequent need to retrieve radioactive wastes from the repository. Lincoln County and the City of Caliente are concerned about retrieval related exposure pathways as well as transportation implications of moving retrieved wastes. Exposure inducing events both on and off-site associated with retrieval activities must be fully considered within the EIS. The EIS should evaluate various methods of ensuring that wastes can be safely and efficiently retrieved. Such an analysis should consider alternative lengths of time within which emplaced wastes would be fully retrievable. DOE should not in this analysis be constrained by current regulatory guidance (ie. 50 or 100 year retrieval periods). Rather the EIS should serve to assist decision-makers to decide what length of time and under what circumstances waste will

remain retrievable and might be reclaimed.

2.1.4 Closure - The repository EIS should evaluate alternative strategies for closure of the disposal site. Differentiation between closure to limit exposure and closure to limit on-going management requirements should be clearly delineated. In this regard the EIS should evaluate the possibility that the repository is never really permanently "closed", but rather is sealed sufficient to prevent exposure while preserving long-term retrievability of wastes. A comparative analysis of the merits of backfilling the facility vs. other means of closure should be included within the EIS. Alternative materials which might be used to achieve closure should be evaluated against their contribution to risk management, Retrievability and cost. The relative merits of alternative backfill materials with regard to their contribution to drift stability and as capillary barriers should be considered within the EIS.

2.1.5 Post-closure - Following closure of the repository, an inadvertent breach of containment could result from future human intrusion. Encroachment from the surface could produce an atmospheric pathway for exposures to downwind populations. The extension of the Overthrust Belt geologic feature southwest through Lincoln County towards NTS suggests the potential for economic valuable concentrations of subsurface fossil fuels below the repository horizon. In addition, the potential for future mineral exploitation at the site can not be eliminated. Because of these possibilities, the repository EIS should consider alternative modes of human intrusion into the repository horizon. Engineered barrier alternatives should be evaluated to determine their performance following closure under assumed conditions of human intrusion. The relative contribution to risk management of various modes of warning future generations about the hazards of breaching repository containment should be considered in the EIS.

2.2 Rail Transportation (within Nevada)

Rail access to the Yucca Mountain site does not currently exist. DOE has indicated its preference for shipping most if not all spent nuclear fuel and other high-level radioactive waste to the site by rail. To facilitate rail access, a branch line or spur between a mainline and the site will need to be sited, constructed, operated, and potentially de-commissioned. Numerous options exist for accomplishing each phase of rail access. DOE has also indicated its desire to ship low-level radioactive waste to NTS with rail being a preferred transport mode. Within Nevada, DOE-NVO has made clear its desire to ship waste to NTS by rail but has acknowledged that rail access is wholly dependent upon the high-level waste program. The repository EIS must consider the likelihood that transportation infrastructure developed for high-level waste will also be utilized for shipments of LLRW through Lincoln County to NTS. The cumulative effects of both HLW and LLRW shipments should be evaluated. In addition, the effect that use

of a proposed rail spur for LLRW shipments may have on route construction and operational economic feasibility should be considered within the EIS.

2.2.1 Routing - The Notice-of-Intent declares DOE's plan to consider several alternative rail corridors to the repository. Previous rail routing studies have been performed by DOE, the State of Nevada and Lincoln County. Each of these studies have made clear the technical feasibility of a rail route leaving the mainline Union Pacific within and traversing Lincoln County. DOE has identified such alternatives as "Caliente A and B Routes". An engineering study completed for Lincoln County and the City of Caliente has determined that a modification of the Caliente A and B routes which provides access to NTS by crossing the Nellis Range, is technically feasible and cost effective.[6] More recently, legislation pending before Congress suggests that, a rail spur across Lincoln County originate near Crestline at the Union Pacific mainline.

The preceding discussion illustrates that there are numerous routing options for developing rail access to NTS across Lincoln County. Consideration of these routes by DOE should include their potential for enhancing access and mining of important mineral resources located within the area. The County and the City of Caliente believe that DOE should consider in detail the comparative merits of three options within the repository EIS. One alternative which must be considered within the EIS is Crestline to Yucca Mountain via access to NTS through the Nellis Range near the community of Rachel. This route is commonly known as the Modified Caliente Route as described in legislation considered by the House Commerce Committee (Figure 1). Additionally, DOE must consider the Crestline to Yucca Mountain routes which go around the Nellis Range, also generally known as the Caliente A and B Routes (Figure 2).

It is important to note that each of the three alternatives for crossing Lincoln County are significantly different. The three routes are characterized by wide variances in total track mileage, potential disturbed area, proximity to Wilderness Study Areas, relationships to other federal activities, and potential for regional economic impact. A decision by DOE to treat these options collectively as one may lead to less than adequate analysis of each. Without adequate analysis of each of the Lincoln County rail routes, decision-makers will be prevented from reaching sound routing conclusions. DOE should not be tempted to include other potentially less feasible alternatives (ie. the Modified Valley route, the Jean route or the Carlin route) in the EIS if such inclusion will in any way undermine the brevity of analysis given to cross-Lincoln County options.

2.2.2 Construction - The repository EIS should consider alternative strategies for construction of the rail spur serving Yucca Mountain. Alternatives to be considered should include construction standards (ie. rail strength, types of ties, maximum curve

radius, maximum grade, and train speed). Each of these alternatives should be assessed to determine their contribution to risk management and environmental impact. In addition, various methods for management of construction should be addressed from the perspective on regional economies. One option might involve a single construction crew building the entire line over an extended period of time. Alternatively, multiple crews could be employed to simultaneously build various segments of the spur. Because of the propensity for regional economic and environmental impacts, the EIS should also consider the use of concrete versus wooden ties. Similarly, alternative locations for material sites (ie. ballast) should be evaluated within the EIS. Another set of alternatives which might be considered concern whether or not union labor is required for construction. The use of union labor may impose a significant barrier to local resident employment in rail spur construction activities.

2.2.3 Operation - Various options for operation of the rail spur need to be considered within the EIS. Operational alternatives affecting transportation safety requiring evaluation include varying maintenance schedules and standards (ie. for roadbed, track and trains); options for coordinating train movements with Air Force overflights; train speeds; and options for provision of security against sabotage or acts of terrorism. Alternative locations for train maintenance and crew change facilities should be evaluated in the EIS. Such facilities and activities may induce economic impacts in their host locales. In addition, the repository EIS should consider the potential for and implications of allowing shared-use of the rail spur by other government agencies (ie. Air Force) and industrial users (ie. mining and energy). Alternative alignments through Lincoln County may have differing possibilities for shared use. Options for ownership and operational management of the rail spur should also be evaluated within the EIS. Alternatives might vary from DOE owned and operated to private ownership and operation. Alternatively, DOE might own the line and the private sector might operate it. Each of these options should be evaluated against their contribution to risk management and regional economic benefit.

Options for achievement of emergency management along the rail spur should be considered in the EIS. Alternatives might include enhanced local government response capabilities; placement of contractor response crews along the rail corridor; and provision of specialized equipment for train and shipping container handling.

2.2.4 Decommissioning - Emplacement of radioactive waste at the Yucca Mountain site is scheduled to occur over a 25 to 30 year period. It is not clear what the disposition of the rail spur to Yucca Mountain will be following cessation of emplacement. Several alternatives are possible and should be considered within the EIS. Possible options include among others: (1) abandon the line at the end of emplacement; (2) maintain the line during the period of monitored retrievability (ie. 50 years) in case waste needs to be

removed from the site; and (3) sell or deed the line to another governmental or private party following emplacement of waste. Consideration of these alternatives should consider regional economies, impacts upon other public and private users, and barriers to effective relocation of waste from the site in the event removal is required.

2.3 Legal Weights Trucks (within Nevada)

DOE's Notice of Intent recognizes the potential for shipments of spent nuclear fuel and other high-level radioactive waste to be transported to Yucca Mountain via legal weight trucks. Issues involving use of legal weight trucks which must be considered within the EIS include routing and operations. An over-arching issue is the range of alternative magnitudes with which legal weight trucks would be used in transporting waste.

2.3.1 Routing - Pursuant to HM-164, legal weight shipments of spent nuclear fuel and other high-level radioactive waste must be confined to the U.S. Interstate and federal highway system. Within Lincoln County, U.S. Highway 93 is a candidate route which must be considered within the EIS. In addition, State Route 318, must be evaluated due to its identification by the State of Nevada as a possible state designated route.

2.3.2 Operation - Operational alternatives which should be considered within the EIS include escorted versus unescorted shipments; time of day travel restrictions verus unrestricted transport; and use of local versus non-local trucking firms. The first two should be considered for their contribution to risk management. The third option set should be evaluated to determine regional economic benefits. In addition, the EIS should consider the impacts of alternative vehicle payloads upon highway infrastructure and maintenance costs and traffic safety.

Options for achievement of emergency management along legal weight truck routes should be considered in the EIS. Alternatives might include enhanced local government response capabilities; placement of contractor response crews along the highway corridor; and provision of specialized equipment for truck and shipping container handling.

2.4 Heavy Haul Trucks (within Nevada) - According to the Notice-of-Intent the repository EIS will consider use of heavy-haul trucks. Use of heavy-haul trucks poses several concerns which must be addressed within the EIS. Heavy-haul truck decision alternatives which must be evaluated include routing, construction, and operational issues.

2.4.1 Routing - The recent DOE OCRWM transportation study for the Yucca Mountain project suggests that three alternatives for heavy-haul access to the site appear feasible.

Within Lincoln County, the DOE report identifies heavy-haul from the vicinity of Caliente across U.S. 93 to State Highway 376 as one alternative. an additional option included in the DOE report involves heavy-haul transport from the vicinity of Elgin along the Kane Springs Road to U.S. Highway 93 north to State Highway 376 west. In addition to consideration of these options, the EIS should evaluate access by heavy-haul truck across the Nellis Range near Rachel as an alternative to circuitous routing through Nye, Esmeralda and/or Clark counties. DOE is encouraged to utilize local information in conducting evaluations of route options.

2.4.2 Construction - The use of heavy-haul truck to transport radioactive wastes may impose requirements for construction or reconstruction of highway infrastructure. For each routing alternative considered, the EIS should evaluate alternatives for establishing and maintaining a highway system capable of withstanding repeated heavy-haul loads. Where new road construction is required, improved yet un-paved surfaces should be evaluated against pavement. Risk management benefits associated with options for construction of dedicated travel lanes in areas of excessive grades or poor sight distance should be evaluated.

2.4.3 Operations - Operational alternatives which should be considered within the EIS include escorted versus unescorted shipments; time of day travel restrictions verus unrestricted transport; and use of local versus non-local trucking firms. The first two should be considered for their contribution to risk management. The third option set should be evaluated to determine regional economic benefits. In addition, the EIS should consider the impacts of alternative vehicle payloads upon highway infrastructure and maintenance costs and traffic safety. In addition, alternative locations for heavy-haul fleet maintenance facilities should be evaluated for their contribution to regional economic conditions.

Options for achievement of emergency management along legal weight truck routes should be considered in the EIS. Alternatives might include enhanced local government response capabilities; placement of contractor response crews along the highway corridor; and provision of specialized equipment for heavy-haul truck and shipping container handling.

2.5 Intermodal Transfer (within Nevada)

To facilitate use of heavy-haul trucks, DOE will need to establish one or more rail to truck transfer facilities. The repository EIS should consider the location, construction and operational alternatives of such facilities.

2.5.1 Location - DOE will need to establish one or more rail to truck transfer facilities at

the origin points for various heavy-haul routes. Within Lincoln County, such sites could according to DOE's recent transportation study be located at Caliente and near Elgin. The EIS should evaluate the relative merits of each site.

2.5.2 Construction - Options for construction of the intermodal transfer facility should be evaluated for their contribution to risk management and regional economic benefit. For example, fixed-place overhead cranes could be installed to facilitate shipping container transfer. Alternatively, rubber-tired cranes might also be employed for transfer operations. Fixed support facility requirements might vary for each type of transfer technology employed. The EIS should also evaluate the local economic contribution which use of local contractors might involve. In addition, the EIS should consider the risk/cost trade-off for alternative canister handling technologies.

2.5.3 Operations - Alternatives for accomplishing operation of the intermodal facility should be evaluated for their contribution to risk management and local economic benefits. DOE and DOE/contractor approaches should be considered against private development and operation. Options for shared use of the facility by other government (ie. defense) and private industries should be assessed for their contribution to regional economic development. Alternatives for management of throughput at the facility should be evaluated for their relative contributions to risk management. Of particular concern to the County and City is the potential for buildup of loaded canisters at the intermodal transfer site. The EIS should evaluate the exposure risks associated with alternative numbers of in-transit containers resident at the site.

Options for achievement of emergency management at the intermodal transfer facility should be considered in the EIS. Alternatives might include enhanced local government response capabilities; placement of contractor response crews at the facility corridor; and provision of specialized equipment for heavy-haul and shipping container handling.

2.5.4 Decommissioning - Emplacement of radioactive waste at the Yucca Mountain site is scheduled to occur over a 25 to 30 year period. It is not clear what the disposition of the intermodal transfer facility will be following cessation of emplacement. Several alternatives are possible and should be considered within the EIS. Possible options include among others: (1) abandon the facility at the end of emplacement; (2) maintain the facility during the period of monitored retrievability (ie. 50 years) in case waste needs to be removed from the site; and (3) sell or deed the facility to another governmental or private party following emplacement of waste. Consideration of these alternatives should consider impacts upon local economies, impacts upon other public and private users, and barriers to effective relocation of waste from the site in the event removal is required.

2.6 Level of Analysis

Each of the alternatives and subalternatives considered within the repository EIS must be evaluated in a comparative form to enable a clear foundation for choice among the options. The extent of analysis focused to each alternative must be largely similar to that devoted to the proposed action and each subset of the proposed action.

3.0 Affected Environment

The EIS must present a thorough description of the natural, social, economic, and built aspects of Nevada which may be impacted by the proposed alternative and its subset alternatives and all options thereto considered. All aspects of repository system siting construction, operation, and de-commissioning should be included when determining the geographic scope of the study area to be considered. Lincoln County must clearly be included within the scope of the affected environment owing to the areas significance for transportation and off-site downwind implications of the repository system. Generally, the description of the affected environment of Lincoln County must consider physiographic, cultural/historic, and socioeconomic attributes of the area. Descriptions of the affected environment within the County should be detailed enough to enable delineation of subarea impacts (ie. City of Caliente, Alamo, etc.). To the maximum extent practical, DOE should rely upon baseline descriptions of the affected environment developed and/or compiled by Lincoln County and the City of Caliente. Section 8 of this report contains a listing of references available to DOE.

3.1 Physiographic

This section of the description of the affected environment should address the natural features of Lincoln County. Natural attributes of the County which might be impacted by or might impact safe repository system development and operations include air quality, climate, hydrology, geology, flora and fauna, noise, viewshed and background radiation. Without an adequate description of these pre-repository system conditions within the County, post system impacts will be difficult to ascertain.

3.1.1 Air Quality - State air quality standards are not to be exceeded in areas where the general public has access. Currently, Lincoln County is in attainment status and is qualified as "better than national standards" in emissions of total suspended particulate and sulfur dioxide. Present air quality conditions in the County do not pose a health threat to residents and visitors. Industries considering relocation to the County are not confronted with costly emission offset requirements. Construction and operation activities related to repository transportation functions may serve to significantly alter existing ambient air quality within specific locations of Lincoln County. Fugitive dust may also impair visibility reducing transport safety. The EIS should include a description of ambient air quality conditions within potentially impacted basins of Lincoln County.

3.1.2 Climate - Although construction and operation of repository system components within Lincoln County will not likely affect regional climate, local climatic conditions may impact upon safe operation of the repository system, particularly transportation. The repository EIS must consider the impacts of climate upon safe transport of radioactive wastes. Aspects of the climate in the County which need to be considered include precipitation (particularly snow and ice), temperature (as may impact upon highway infrastructure and road surface conditions), and fog. Climatic conditions can vary significantly throughout Lincoln County. High intensity/short duration storms can be characterized by excessive precipitation and high winds. Baseline climate data should be obtained and used for potentially impacted basins within the County.

3.1.3 Hydrology - Both surface and groundwater hydrology may be altered by construction and operation of repository system components within Lincoln County. Depending upon sources and volume of use, construction process water requirements (for use in railbed and highway improvement construction) may impose local quantity and quality impacts on existing wells and springs. The EIS should include a description of existing wells and springs within Lincoln County hydrographic basins potentially hosting repository system construction activities. Said information should include depth to groundwater, flow attributes of existing springs, and existing water quality.

Surface hydrology may impair safe transport and/or handling of radioactive wastes and may be significantly altered by construction activities. For all areas within Lincoln County potentially impacted by repository system construction and operations, mapping of surface hydrology and estimates of baseline flows should be included within the EIS. High intensity storms can result in locally significant flash flood events.

3.1.4 Geology - Baseline geology and soil conditions may impact upon construction and operation of repository system components within Lincoln County. Fault and soil features may impair facility integrity. Alteration of area soils may induce or exacerbate flooding, water quality, and air quality impacts. In addition, construction of a rail spur through Lincoln County will require extensive quantities of ballast and other roadbed materials. The repository EIS should include an inventory of potentially suitable sites to borrow materials within Lincoln County. The repository EIS should include geologic and soils mapping for all candidate sites and corridors potentially hosting repository system components within Lincoln County. The inventory of soils should be completed to also facilitate preparation of plans for revegetating areas disturbed by construction activities. DOE should note that Lincoln County has county-wide digital soils map coverage at 1:100,000 scale.

3.1.5 Flora and Fauna - The construction and operation of a one-hundred mile plus rail

line across Lincoln County will result in disturbances to vegetation, displacement of wildlife, and disruptions to wildlife movement. It is possible that one or more species of federally listed threatened and endangered plants and animals may be impacted. To facilitate evaluation of these possible impacts, the EIS must include an assessment of existing populations and conditions of vegetative and animal resources along alternative rail corridors. The analysis should consider regional populations of wildlife and feral horses whose movement and distribution may be impacted by a rail corridor. In addition, such an assessment should include possible construction material sites and areas where extensive highway improvements may be possible. Lincoln County is particularly concerned about losses of big game habitat and impacts on hunting's contribution to the local economy.

3.1.6 Noise - Ambient noise levels which are generally very quite, are considered a desirable attribute within Lincoln County. Increased levels of noise may serve to erode local quality of life. In addition, heightened noise can adversely effect distribution of wildlife. The repository EIS should include an assessment of background noise levels along proposed rail corridors and at locations potentially hosting other repository system components and activities (intermodal transfer, borrow sites, highway construction, heavy-haul transport).

3.1.7 Viewshed - The scenic beauty of Lincoln County heightened by the expansive views afforded by the basin and range topography of the area. Many valleys through which alternative rail corridors pass, can be characterized by minimal development and land surface disturbing activities. Construction and operation of a rail line through Lincoln County may serve to alter existing viewshed conditions. To facilitate an assessment of impacts upon viewshed, the repository EIS should include an analysis of existing visual quality within basins potentially impacted by rail construction and operation. This baseline information can be used in developing measures for mitigation of impacts to viewsheds within Lincoln County.

3.1.8 Background Radiation - The transportation of spent nuclear fuel and other high-level radioactive wastes through Lincoln County may increase the risks of exposure to radiation for residents and visitors to the area. Existing risks of exposure can be attributed to natural and human induced background radiation. Because of the potential for cumulative exposures to heighten risks, it is necessary for the repository EIS to adequately assess baseline sources of radiation exposure within Lincoln County. A recent study for the County makes clear the potential for the cumulative effects of exposure to radiation sources to result in adverse consequences for public health and safety.[7] This study provides the scientific justification for quantification of the cumulative risks of exposure to radiation associated with natural background sources, historic DOE

weapons testing activities, on-going DOE activities at NTS, future low-level radioactive waste transport and disposal activities in Nevada, and future high-level waste transport and disposal activities in Nevada. The long-term physiological consequences associated with repeated exposures to radiation are cited in the report as very real.

3.1.8.1 Natural - Radiation exposure risk associated with solar and geologic factors for various areas within Lincoln County should be characterized within the EIS.

3.1.8.2 Human Induced - To ensure that the potential for and effects of cumulative exposure to radiation from DOE activities and other source terms is fully understood and assessed, the repository EIS must include a baseline assessment of historic and existing exposures by residents of Lincoln County. The description of the existing environment within the EIS should seek to quantify and present cumulative and on-going exposures to human-induced radiation. Sources may include residential and commercial buildings, occupational hazards, household hazards, ingested products, historic DOE activities at NTS, on-going DOE activities at NTS, and existing shipments of hazardous constituents through the County. Without this information, it will not be possible to establish the relative degree of significance of additional radiation exposure associated with high-level waste handling and transport within Lincoln County. Because exposures levels may vary throughout Lincoln County, specific information on a community level should be included within the EIS.

3.2 Cultural/Historic Resources

The study and interpretation of prehistoric and historic sites can lead to a better understanding of the history of the region containing Lincoln County. In addition, such resources can help to support the tourism sector of the County's economy. To ensure that such sites are not impacted by repository system development and operation, it is imperative that they be inventoried and considered within the context of the repository EIS. Paleontologic, archaeologic, and historic resource inventories are needed within Lincoln County.

3.3.1 Paleontologic - The potential for remains of pre-historic species of plants and animals to occur within Lincoln County is great. The area is characterized by geologic conditions within which such resources have been previously discovered. An assessment of paleontologic resources within alternative rail corridors and at potential borrow pit sites within Lincoln County should be conducted and reported on within the scope of the repository EIS.

3.3.2 Archaeologic - Evidence of early Native American habitation of Lincoln County can be observed at hundreds of locations throughout Lincoln County. The likelihood that

alternative rail corridors within the County will include archaeologic sites is very great. The repository EIS should include field surveys of alternative rail corridors, material sites, and other areas where construction may occur to determine the location and significance of any archeological resources.

3.3.3 Historic - Evidence of efforts in the settlement of the west by Anglo-Americans is apparent throughout Lincoln County. Whether they be Mormon homesteads or mining townsites, these locations represent pieces of history important for study and observation by professional and amateurs alike. The County is host to numerous historic sites which annually play host to researchers and recreationists. It is possible that proposed rail corridors may have an impact upon the historical integrity of such sites. To ensure that rail construction does not adversely impact upon important historic resources within Lincoln County, preparation of the repository EIS should include an inventory of such sites.

3.3 Socioeconomic

Development, operation and decommissioning of transportation and other waste handling facilities within Lincoln County will result in an impact upon local socioeconomic conditions. Some of these effects will be desirable and the County and City of Caliente will likely seek to see them maximized (ie. local employment). Alternatively, repository system activities in the County and City will also result in undesirable consequences. It is the intent of the County and City that such negative outcomes of repository development be minimized or eliminated altogether. To facilitate effective mitigation of socioeconomic impacts will require a comprehensive assessment by DOE. A credible assessment of socioeconomic impacts will only be possible by DOE if the agency has at its disposal an accurate understanding of existing socioeconomic conditions within the County and among its communities. Such a baseline assessment of "without repository system" socioeconomic conditions should include the following factors: economy, demographics, social conditions, Native Americans, public perceptions and attitudes, community services, community infrastructure, local government finances, government structure, local politics, telecommunications, emergency management, transportation infrastructure, land use, traffic, military operations, and public health.

The assessment of existing socioeconomic conditions within Lincoln County should consider potential changes in the aforementioned parameters absent of repository system development and operations. The repository EIS should present a comprehensive appraisal of current and without repository future socioeconomic conditions. This baseline of information can then be used to compare against projected with repository conditions to extract resultant system impacts upon the County and its communities.

3.3.1 Community Areas - Development, operation and decommissioning of the repository system will result in socioeconomic impacts which are spatially dispersed and differ in characteristic and magnitude among various communities in Lincoln County. Numerous studies have been conducted which demonstrate significant differences between sociocultural and economic attributes of Lincoln County communities.[8,9] To ensure that assessment of such impacts is thorough, accurate and has utility for use in mitigation planning, disaggregation of effects at a sub-county level will be essential within the repository EIS. To facilitate such a sub-county evaluation of effects, the baseline assessment of "without repository system" or baseline socioeconomic conditions should also be developed at the community level. At a minimum, baseline data should be compiled and made available to support impact assessment for the following geographic areas within Lincoln County: countywide, Alamo, Hiko, Rachel, Caliente, Panaca, and Pioche. The repository EIS should present at least a summary of community-level socioeconomic data, with more extensive information reserved to a technical appendix or other document(s) included in the EIS by reference.

3.3.1.1 Countywide - Because the Notice of Intent makes clear DOE's plan to consider rail spur, intermodal transfer and heavy-haul truck options within Lincoln County, the affected environment must be considered to include the County. Evaluation of baseline and "with repository system" impacts at the County level is important to facilitate comparative assessment among alternatives and to enable consideration of issues such as county-wide economic and fiscal consequences.

3.3.1.2 Alamo - The community of Alamo is bisected by U.S. Highway 93 which has been identified by DOE and the State of Nevada as a potential transportation corridor for legal weight trucks carrying spent nuclear fuel and other high-level radioactive waste.[10,11] In addition, a recent DOE study has identified U.S. Highway 93 through Alamo as a possible corridor for radioactive waste shipments by heavy-haul truck.[12] Because residents of the community currently commute to employment located on NTS, it is reasonable to expect that repository jobs may in part be filled by persons either currently residing in, or choosing in the future to locate to Alamo. Because of its relatively small population base, any change in population (although small in absolute terms), may significantly affect local socioeconomic conditions. The affected environment described within the repository EIS should explicitly include the community of Alamo as a subarea of Lincoln County.

3.3.1.3 Hiko - The community of Hiko is bisected by State Highway 318 which has been identified by the DOE and the State of Nevada as a potential transportation corridor for legal weight trucks carrying spent nuclear fuel and other high-level radioactive waste.[13,14] In addition, a recent DOE report has identified a possible rail route which would pass to the immediate west of Hiko.[15] As a small agricultural community, nearby transportation

and construction related activities could impose significant impacts upon this area. The affected environment described within the repository EIS should explicitly include the community of Hiko as a subarea of Lincoln County.

3.3.1.4 Rachel - Rachel is a small community whose economy is characterized by agriculture, federal government employment, and retirees. The community is adjacent to State Highway 375 and Valley Road, the latter providing access to the Nellis Air Force Range and NTS. A recent study by DOE has identified State Highway 375 as a candidate corridor for radioactive waste transport involving legal weight and/or heavy-haul trucks.[16] This same study, indicates that one option for provision of rail access to Yucca Mountain would pass to the immediate north of Rachel. Legislation pending before Congress would route both heavy-haul trucks and rail access along the Valley Road, which is immediately proximate to Rachel. Construction and operation of these transportation alternatives could impose a range of positive and negative impacts upon the social and economic conditions of Rachel. The affected environment described within the repository EIS should explicitly include the community of Rachel as a subarea of Lincoln County.

3.3.1.5 Caliente - Lincoln County's only incorporated community, the City of Caliente is bisected by the Union Pacific mainline. A recent study by DOE has identified Caliente as a possible location for development and operation of a rail to heavy-haul truck intermodal transfer facility.[17] This same report suggests that the mainline Union Pacific railline through Caliente may serve as a corridor to intermodal transfer facilities alternatively located at either Elgin (approximately 20 miles south of Caliente) or in Las Vegas. Construction and operational aspects of these repository system activities in and around Caliente would likely result in significant socioeconomic effects. The affected environment described within the repository EIS should explicitly include the City of Caliente as a subarea of Lincoln County.

3.3.1.6 Panaca - Historically, the U.S. Air Force and the DOE have utilized State Highway 319 through Panaca to transport legal weight and heavy-haul shipments to the Nellis Range and NTS. Legislation pending before Congress would require the construction and operation of a rail spur between Crestline (approximately 20 miles from Panaca) and Yucca Mountain. The spur would pass within a few miles of Panaca. A small agricultural community, construction and operational aspects of highway and rail transportation activities could impose significant impacts upon Panaca. The affected environment described within the repository EIS should explicitly include the community of Panaca as a subarea of Lincoln County.

3.3.1.7 Pioche - The Lincoln County seat, Pioche is an important center for local government. A recent DOE study has identified U.S. 93 (which is immediately adjacent

to Pioche) as a potential corridor for legal weight truck shipments of radioactive waste.[18] This same study identifies a possible rail spur corridor which is located less than 20 miles to the southwest of the community. A significant industrial infrastructure (lime kiln) exists near to Pioche at Caselton. Repository system construction requirements may result in start-up of this now closed manufacturing facility (ie. to support construction of concrete ties). Repository system development and operational growth related socioeconomic effects throughout Lincoln County will likely induce change in the community of Pioche. The affected environment described within the repository EIS should explicitly include the community of Pioche as a subarea of Lincoln County.

3.3.2 Economy - The affected environment section of the repository EIS should include a thorough description of the economy of Lincoln County and its subareas. Of particular emphasis should be the extent to which historic benefits of NTS related DOE activities have accrued to southern Nevada rather than Lincoln County communities (distributional equity). This section should also clearly evaluate the historic and existing significance of DOE activities on the economy of the County and its subareas. As shown in Table 1, NTS activities contributed nearly 5 percent of total personal income within Lincoln County during 1990.[19] NTS was nearly 35 times as important to the economy of Lincoln County during that year as it was to Clark County (see Table 1). It is important that the affected environment section of the repository EIS emphasize the significance of NTS to the Lincoln County economy as contrasted to Clark County. This difference in importance should be reflected in the level of detail given to estimates of social and economic impact among Nevada counties. In this regard, DOE is expected by the County to provide a comprehensive evaluation of economic conditions and impacts locally.

3.3.3 Demographics - Lincoln County and its communities are characterized by relatively small population bases. Growth trends among these communities vary significantly. the capability of each community to assimilate new population or to fiscally manage losses in population also vary widely. Given the potential for repository system development and operational activities in the County to induce significant changes in population, the affected environment section of the repository EIS must give thorough consideration of existing and future without repository demographic conditions. The description of demographic trends should be disaggregated to the community area.

Table 1
Estimated Personal Incomes Within Nye, Esmeralda, Lincoln
and Counties Attributable to NTS Employment

County	Estimated 1990 NTS Employment	1990 NTS Direct Personal Income	1990 Total Population	1990 Total Personal Income	1990 NTS Personal Income as a Percent of Total Personal Income
Nye	470	$15,402,370.00	17,781	$274,787,574	5.61
Esmeralda	15	491,565.00	1,344	29,913,408	1.64
Lincoln	75	2,457,825.00	3,775	50,400,000	4.88
Total For Three County Area	560	18,351,760.00	22,900	355,100,982	5.17
Clark	650	21,301,150.00	770,280	14,812,680,000	0.14

Sources: Nye County data compiled from data contained in, Nye/Esmeralda Economic Development Authority, Draft Nye County Overall Economic Development Plan, July 1993. Lincoln County data compiled from, Intertech Services Corporation, 1993 Lincoln County Labor Market Survey and Update, prepared for Board of Lincoln County Commissioners, November 1994. Esmeralda County data compiled from, Intertech Services Corporation, Characteristics of the Esmeralda County Labor Supply, prepared for the Board of Esmeralda County Commissioners, September 1994. NTS personal direct personal income estimated by applying 1990 NTS/TTR per capita incomes for Nye County residents to 1990 NTS employment levels within each county.

3.3.4 Social Conditions - The social tapestries which characterize each community in Lincoln County vary greatly. Religious and occupational variation contribute greatly to community social delineation. Age clusters define important social characteristics within each community. Previous studies by the State of Nevada have detailed differences in social conditions among Lincoln County communities.[20,21] Growth within Lincoln County's small communities may induce significant changes in social conditions. The affected environment section of the repository EIS should provide a thorough description of social indicators for Lincoln County communities.

3.3.5 Native Americans - Although studies sponsored by the State of Nevada have not identified any concentrated Native American communities within Lincoln County, a dispersed population of persons with significant Indian ancestry do live in the County.[22] In addition, may sites within Lincoln County are likely to have historical significance to Native Americans living in the region.

3.3.6 Public Perceptions and Attitudes - A description of the socioeconomic aspects of the affected environment within Lincoln County would not be complete without consideration of public perceptions and attitudes. Peoples convictions can and frequently do result in action. Lincoln County and the City of Caliente are concerned that legitimate and ill-conceived perceptions of repository system risks may induce adverse consequences to local social and economic conditions. Because residents and visitors to the area face existing and will face future "without repository" hazards, it is imperative that existing perceptions and attitudes be fully understood so as to enable complete evaluation of repository system induced changes in cognition. The availability of this information will enable County, City and DOE planners to effectively plan communication and other response strategies intended to mitigate behavioral consequences of negative perceptions of risk. For example, previous research sponsored by Lincoln County has demonstrated that media amplification of risk may induce unanticipated responses by area residents.[23] Such a public reaction may constrain local emergency management effectiveness.

3.3.7 Community Services - The relatively small populations of Lincoln County and its communities do not obviate local government requirements to provide community services. In many cases, (education, police, judicial, county commission, etc.) functions are required by state law. Like most other areas, residents of the County require local government to provide a variety of other services, may which may be optional (ie. library).

The quality of community services is largely a function of the local governments ability to pay. Ability to pay is directly related to local resident willingness to pay taxes and fees as well as levels of state and federal revenue sharing. Volunteerism is also an important ingredient to certain community services. Volunteer fire departments can not exist without the commitment of volunteer fire fighters. Suffice it to say that Lincoln County and the City of Caliente consistently strive to provide the maximum level of community services that limited fiscal and volunteered resources will allow.

Repository system related population change will impact the ability of Lincoln County, the City of Caliente and other area communities to provide community services. Increased demands for services, if not paced by increased funding and/or volunteers, will not likely be satisfied. In the event that population declines, existing levels of community service may not be sustainable. Maintenance of certain community services (ie. emergency response, medical, highway maintenance) may be related to management of repository system risks.

The repository EIS should include an assessment of existing and future "without repository" community service characteristics within Lincoln County and among its various communities. When included in the affected environment section of the EIS, this information will be useful for comparison with "with repository" service demands to determine net impacts.

3.3.8 Community Infrastructure - Lincoln County and the City of Caliente have conducted several assessments of the capacity and demand for vital community infrastructure (ie. water, sewer, roads).[24] These studies have shown that demands for infrastructure often are at or exceed design capacities. As a consequence, additional demands placed on community infrastructure may result in requirements for additional capacity. Conversely, in some cases Lincoln County communities have recently expended funds and/or incurred long term liabilities to expand infrastructure (ie. Caliente wastewater treatment, Panaca water system, Caliente electrical system). In the event that population in these areas was to decline, a financial hardship might accrue to remaining residents.

The repository EIS must be capable of assessing repository system implications upon the supply and demand for community infrastructure within Lincoln County. To enable such an evaluation, it is essential that the affected environment section of the document include a thorough assessment of existing and "without repository" future supply and demand of said infrastructure. Included in the assessment should be all public infrastructure supporting education, administration, public safety, recreation, water and wastewater, flood control and storm drainage, judicial, public and other related activities.

3.3.9 Local Government Finances - As noted previously, the ability of Lincoln County and the City of Caliente to respond to demands for expanded community services and infrastructure will be largely dependent upon available finances. Lincoln County and the City of Caliente have completed assessments of fiscal and operational conditions and issues.[25] These studies suggest that without additional revenues, the County and City will be unable to absorb and finance any new requirements for community service or infrastructure. In many cases, impacted communities are faced with the prospects of financing community improvements in advance of growth related revenues being available. The narrow revenue base which characterizes Lincoln County and the City of Caliente makes advance funding of needed improvements very difficult. As a result, development of needed improvements will typically lag significantly behind when they are first required. This situation can pose serious public health and safety consequences. In addition, local quality of life can be diminished as existing community facilities and services are overused.

Given the small size of communities within Lincoln County, development and operation of repository system components may further stress existing local government finances. To enable the accurate estimation of these consequences, it is imperative that the affected environment section of the repository EIS include an assessment of local government finances within Lincoln County and the City of Caliente.

3.3.10 Government Structure - Changes in population and economic conditions may induce requirements to alter existing government structures. Such changes might include the numbers of elected local officials, access to local government, and creation or elimination of local government functions. In order to assess these implications of repository system development and operation, it is necessary for the EIS to include a baseline appraisal of existing government structures within Lincoln County.

3.3.11 Local Politics - The potential for development and operation of repository system components within Lincoln County has already demonstrated the ability to bear upon local politics. Actual development and operations can be expected to induce additional political divisiveness. Political strife over one or a subset of issues can result in lack of necessary focus upon other critical issues. Local elections can be influenced by controversy surrounding community responses to repository system development and operations within Lincoln County. To ensure that the repository EIS is capable of evaluating possible impacts upon local politics, it is essential that a baseline assessment of political landscape be included.

3.3.12 Telecommunications - Because of their relative remoteness, Lincoln County communities are extraordinarily dependent upon telecommunications services. For its

size, Lincoln County enjoys a state-of-the-art telecommunications system. However, the small, population base of the area makes maintenance and expansion of the system difficult. To ensure effective risk management and to accommodate population growth, subsequent modifications in the system may be required. A baseline evaluation of telecommunications capabilities within the County is needed if "with repository" implications are to be estimated.

3.3.13 Emergency Management - Lincoln County and the City of Caliente have prepared periodic assessments of local emergency response capabilities.[26,27] In addition, the County and City, in consultation with their Local Emergency Planning Committee, have identified 83 possible constraints to effective local first response capabilities to accidents involving high-level radioactive wastes.[28] This information should be updated and considered within the repository EIS. "With repository" emergency response needs can then be compared with baseline conditions to determine improvements needed to provide adequate risk management. The inability of local first responders to effectively manage incidents involving high-level radioactive wastes may result in significantly increased risks associated with related accidents. This possibility should be thoroughly assessed within the repository EIS.

3.3.14 Transportation Infrastructure - Shipments of radioactive waste by legal weight and heavy-haul trucks through Lincoln County will impact local transportation infrastructure. In addition, repository system construction and operations within the County will induce increased traffic and demands upon local roadways. In order for the repository EIS to be able to consider impacts to transportation infrastructure, an assessment of current and expected "without repository" roadway conditions, capacity and use is required in the document.

In addition to impacts on road systems, use of area rail is expected. Lincoln County and the City of Caliente have sponsored regular assessments of rail condition along the UP mainline.[29] These assessments suggest that mainline conditions are improving. They also point out features of the line which may contribute to accident risk. Increased train volume attributed to waste transport may exacerbate adverse conditions supportive of accident risk. In order to understand waste shipment implications on railine safety, an assessment of pre-waste shipment track condition and use is required and should be included within the EIS.

3.3.15 Land Use - Repository system construction and operation within Lincoln County may impact upon or influence local land uses. For example, construction of a hundred mile or more rail line through the County will cross several grazing allotments administered by the Bureau of Land Management. Location of the rail line may impair

access to forage and livestock watering sources located on public and private land. Mining claims and oil exploration leases may be located on lands within rail corridors. Proximate to established communities, repository system induced growth may increase demands for residential, commercial, and industrial development. Limitations in available private lands may constrain local responses to these development opportunities.

To facilitate a comprehensive evaluation of impacts upon current land uses, the repository EIS must include a baseline assessment of land use throughout Lincoln County. This analysis should focus upon lands located within or adjacent to alternative rail corridors, heavy-haul routes, and optional sites for intermodal transfer facilities. Land use plans developed previously by Lincoln County should be considered within this analysis.[30]

3.3.16 Military Operations - Lincoln County is host to a significant portion of the Nellis Air Force Bombing and Gunnery Range. Within the Lincoln County portion of the Range is the infamous yet nonexistent Groom Lake Operating Area (also known by those who tune in to the X Files as Area 51). Related to military operations at the Nellis Range, much of the airspace over Lincoln County is within a designated Military Operations Area (MOA). The extent of military operations within Lincoln County may be both complimented by and impacted through repository system development and operations. For example, shared use of the proposed rail spur by the Air Force may enhance local economic benefits attributable to the line. Alternatively, military overfilghts in the area may increase the risks associated with waste transport by rail or truck locally, Then again, the extensive military presence in the area may serve as a contributing deterrent to acts of terrorism or sabotage involving waste shipments. In order for any or all of these possibilities to be considered, the repository EIS should include an assessment of current and planned military operations within Lincoln County.

3.3.18 Public Health - One of the most important concerns of Lincoln County and the City of Caliente is the protection and enhancement of resident health. Repository system development and operation activities do pose some risk to the health of residents and visitors to the County. In order to accurately assess and monitor repository system health effects over time, it is essential that DOE develop a comprehensive baseline assessment of medical conditions within the County. In addition, this information will enable comparison of repository related health effects to "without repository" medical conditions within the County. This assessment, should enable differentiation of existing and potential health effects attributable to exposure to radioisotopes associated with previous DOE activities at NTS. The results of the epidemiological assessment should be included within the affected environment section of the repository EIS.

4.0 ENVIRONMENTAL CONSEQUENCES

The most extensive component of the EIS should be the evaluation of environmental consequences of various alternatives considered. The environmental consequences section of the repository EIS should provide the scientific and analytical foundation for the comparison of alternatives. The assessment of impacts should be based largely upon the extensive description and understanding of the existing affected environment, discussed previously. This section must evaluate the effects of the environment upon repository system performance and safety. Again, this is particularly true for transportation operations within Lincoln County. The presentation of environmental effects must include the consequences of each alternative and sub-alternative, any adverse environmental impacts which cannot be avoided, the dependence between short-term uses of the environment and the preservation and enhancement of long-term productivity, and all irreversible or irretrievable commitments of resources that would be involved if the proposal or any alternative thereto is implemented.

The repository EIS must consider the full range of possible types of effects including direct, indirect and, cumulative. In addition the EIS should evaluate transportation alternatives to determine their conflicts with existing local development and other plans. Unavoidable impacts should be clearly identified within the EIS. Each aspect of the affected environment (as previously described) should be evaluated to determine the severity and attributes of impacts for each alternative considered. When warranted (ie. socioeconomic impacts), the description of environmental consequences should be disaggregated to the community level. The DOE is encouraged to borrow liberally from the extensive body of research sponsored by Lincoln County.

4.1 Types of Effects

40 CFR 1502.16 and 1508.8 specify the types of effects which must be considered within an EIS. Types of impacts required by regulation to be evaluated include direct, indirect, cumulative and conflicts with land use plans, policies, or controls. In addition, federal regulation requires other types of effects to be considered. These include unavoidable effects, energy requirements and conservation potential, natural or depletable resource requirements, effect on historical and cultural quality, and socioeconomic and market effects.

4.1.1 Direct - Impacts resulting from the proposed action or alternatives thereto which occur at the same time and place are considered direct effects. Examples of direct effects which the County believes must be considered include rail construction related losses in forage for livestock grazing and DOE or contractor employment induced population increase, among others.

4.1.2 Indirect - Impacts caused by the proposed action or alternatives thereto which occur later in time or are further removed in distance from the direct effects can be considered indirect effects. Population growth resulting from location of repository system support industries in the County might be an example. Demands for public services and infrastructure by dependents of DOE or contractor employees is another example.

4.1.3 Cumulative - Lincoln County and the City of Caliente expect DOE to consider the cumulative effects which may result from the incremental impact of the proposed action and alternatives thereto when added to other past, present, and reasonably foreseeable future actions. The inclusion of cumulative consequence stimulating activities should be regardless of which agency or entity undertakes them. An example of particular concern to the County and City is the cumulative effects of exposure to various source terms for radiation within the region. The County and City have sponsored research which has determined that consideration of cumulative exposures to radiation is a scientifically defensible undertaking.[31] In addition, the State of Nevada is currently sponsoring similar research. The repository EIS must consider the cumulative exposure risk associated with previous DOE weapons testing activities, on-going DOE weapons activities, on-going DOE low-level radioactive waste (LLRW) management activities, potential future LLRW management activities at NTS, potential LLRW transportation activities through Lincoln County, proposed high-level waste transport and disposal in Nevada, and natural and other human-induced sources of background radiation.

Other cumulative impact issues which need to be addressed within the EIS include transportation of LLRW through Lincoln County and use of intermodal facilities for LLRW handling. DOE's Programmatic EIS for Waste Management suggests that extensive quantities of LLRW may be destined for NTS. Site specific EIS's (ie. Fernald EIS) suggest that transport by rail of LLRW to as close to NTS as possible is a preferred option. The repository EIS should include a comparative assessment of cumulative impacts associated with the proposed action and any alternatives thereto.

4.1.4 Conflicts With Plans - The repository EIS should consider how construction and operation of repository system components within Lincoln County will conflict with existing federal, state and local land use plans, policies, or controls. In particular, conflicts with the Lincoln County Masterplan and the City of Caliente Mastertplan should be evaluated. The purpose of this analysis should be to support identification and justification of measures to mitigate such conflicts.

4.1.5 Unavoidable - Adverse environmental effects which cannot be avoided through mitigative measures need to be highlighted within the repository EIS. Such impacts may become the focus of compensation, where such appears warranted.

4.1.6 Distributional Equity - Unlike many other projects, the construction and operation of the repository system is characterized by clearly discernable risks and benefits. Also unlike many other industrial activities, the spatial and temporal distribution of these risks and benefits has the potential to be disequitable between places and periods of time. Historically, metropolitan Clark County has been the primary beneficiary within Nevada of economic benefits associated with NTS. At the same time, rural areas, particularly those downwind of the site like Lincoln County, have borne the majority of exposure risks associated with DOE activities. The distribution of risks and benefits associated with DOE activities during the past 30 years has not been fair.

Development and operation of the repository system within Nevada has the potential for extending and perhaps exacerbating this disequitable distribution of risks and benefits. Examples of practices which DOE might adopt which can widen the risk/benefit gap include: use of union workers, most of whom reside in urban areas, provision of subsidized bussing of repository workers electing to reside in Clark County, and purchase of goods and services from vendors located in urban areas, among other possibilities.

The repository EIS should evaluate the distributional equity implications of various options for system development and operation. The evaluation should consider the cumulative aspects of risks and benefits associated with other DOE activities likely to occur within Nevada (ie. LLRW management). This information should be used to inform identification and analysis of alternatives for mitigating the disequitable distribution of repository system risks and benefits.

4.2 Expected Effects

As noted earlier, Lincoln County and the City of Caliente have spent over 10 years conducting an effective independent repository oversight and impact alleviation planning program. These efforts have involved the sponsorship of numerous assessments of potential repository system impacts. This section is intended to summarize the results of key County/City impact studies as a means to substantiate the likely significance of potential repository system effects within Lincoln County. Regardless of whether these effects would be considered desirable or undesirable, the County and City believe all potentially significant impacts must be fully assessed within the repository EIS.

With regard to socioeconomics, the County and City have compiled much of their perspectives on potential impacts in a study entitled The Yucca Mountain High-Level Radioactive Waste Repository and Lincoln County: Characterization of Socioeconomic Impacts and Framework for Assessment of Effects.[32] This study suggests that during peak repository construction activities, as many as 116 area residents could be employed by the repository project. During the emplacement phase of the project, resident

employment would be expected to drop to less than 50 persons. Construction of a rail spur and intermodal transfer facilities within the County and City of Caliente would result in an unknown, yet likely significant, number of employees residing within the area. These employed residents would be distributed among County communities, with the greatest concentration potentially residing in the Alamo and Caliente areas. The potential for resident employment on the project may in part be dependent upon the availability of worker access to NTS through Gate 700. In the event that DOE and the Air Force provide for such access and/or provide employee bussing to the site from the County, numbers of residents employed at the project could be influenced dramatically.

Repository system construction employment would induce direct and indirect population increases in the County. Employee spending would contribute to indirect employment and population effects. To understand total employment, income and population impacts of repository system activities, the County and City retained the University of Nevada, Reno Center for Economic Development to develop an economic projection model for the County.[33] Application of the model to a range of postulated levels of County resident employment on the repository project yields the results contained within Table 2. Increased employment, population growth, and spending would generally be considered a benefit to Lincoln County. The repository EIS must consider possible population effects on the County.

Table 2
Range of Economic Impacts Associated
With Alternative Increases in Construction
Employment within Lincoln County

No. of New Jobs	Income Generated	Total Employment	Total Population	No. Housing Units Required
25	$ 635,576	32	115	34
50	1,271,152	64	230	68
100	2,542,303	128	460	138

Source: Application of the Lincoln County Economic Projection Model developed by University of Nevada, Reno, Center for Economic Development, March 1995.

Given consistently high rates of unemployment in the County and a documented interest by residents to become employed at NTS, efforts by DOE to employ existing residents would both enhance the local economy while at the same time dampening added demands on community services and facilities.[34] Lincoln County was designated

as a Labor Surplus Area by the Assistant Secretary of Labor on October 12, 1995. Under federal regulations, DOE is required to set-aside a portion of its purchases for businesses located within such area. Purchases by DOE and its contractors from local vendors would also serve to enhance the Lincoln County economy. Owing to the County's recent designation as a labor surplus area and DOE's history of having purchased goods from area vendors, it is likely that repository construction related needs for goods and services would in part be met from Lincoln County sources. Table 3 illustrates the economic effects of assumed levels of increased purchases by DOE from Lincoln County vendors. The EIS should evaluate the positive implications of DOE and contractor spending in Lincoln County.

Repository construction related population growth, although small in absolute numbers, will impose new demands on community services and infrastructure. Provision of these capacities will impact local County and City fiscal resources. Additional sales and ad valorem tax revenues, when coupled with user fees, may not be available in time or in sufficient quantity to enable local financing and provision of community enhancements. If repository construction effects are to provide net positive benefits to Lincoln County, some measure of assistance in providing community services and infrastructure may be needed.

To facilitate evaluation of repository system fiscal impacts within Lincoln County and the City of Caliente, the County retained the University of Nevada, Reno, Center for Economic Development to develop a fiscal impact model for the County and City. Application of the preliminary model to assumed location of a 150 person industry in Caliente and Pioche suggests that under Nevada's current tax structure, adverse fiscal consequences to the County and City are possible. These findings imply that even modest repository system related employment and population growth in Lincoln County will produce significant negative fiscal impacts for County and City government. The repository must include a thorough analysis of the fiscal consequences of repository system development and operation upon Lincoln County, City of Caliente, and the Lincoln County School District.

A waste handling accident at the repository site involving a prolonged fire and breach of waste canister integrity could enable migration of radionuclides off-site and into portions of inhabited Lincoln County. Similarly, an extreme seismic event, autocriticality induced explosion, or volcanic event could also provide a mechanism for off-site airborne migration of radiation. It is important to note that Lincoln County is in an area known to be immediately "downwind" of the Nevada Test Site. Historically, deposition of

Table 3
Range of Economic Impacts Associated
With Alternative Levels of Purchases by DOE
From Trade Sector Businesses in Lincoln County

Amt. Spent By DOE	Change in Total Economic Activity	Change in Household Income	Total Employment	Total Population	No. Housing Units Required
$ 50,000	$ 90,379	$ 28,104	2.4	8.5	3
100,000	180,759	56,208	4.7	17	5
250,000	451,897	40,519	11.7	42	13

Source: Application of the Lincoln County Economic Projection Model developed by University of Nevada, Reno, Center for Economic Development, March 1995.

radionuclides within the County has occurred following certain above and below ground weapon tests at the site. The community of Rachel is located 66 air miles north-east of the Yucca Mountain site. Alamo and Hiko are 81 and 86 air miles from the site, respectively. Given average wind speeds in the vicinity of Yucca Mountain of 7.4 miles per hour (mph) and peak recorded gusts of 60 mph, it is possible that airborne radioisotopes could be transported to the proximity of Lincoln County communities within 1.5 to 8 hours.[35] The short airborne emission travel time is in part why DOE has previously declared portions of Lincoln County as within the "Off-site Uncontrollable Area" (OSUA). In the event of a weapons test related breach of containment or venting, DOE has determined that it would be unable to effectively evacuate residents within the OSUA.

A transportation accident characterized by extensive media coverage might result in stigmatization of area tourist destinations. The County and City have sponsored research which evaluates the consequences of the accident at Three Mile Island and applys possible outcomes to a transportation accident.[36]

Following closure of the repository, low-probability high-consequence events may produce impacts in Lincoln County. Airborne emissions containing radionuclides could result from autocriticality induced explosions, extreme seismic activity, or a volcanic event beneath the site. Expected consequences of these events would be similar to those described above for the emplacement and monitored retrieval phases. The repository EIS

must provide a full evaluation of these potential impacts.

Development and use of a rail spur across Lincoln County providing rail access to NTS will result in a wide variety of impacts to the area. All aspects of the environment as described in Section 3.0 Affected Environment will be effected by rail construction activities. While Lincoln County and the City of Caliente believe that construction and operation of a railine will provide important economic benefits, it is essential that likely adverse environmental and land use impacts be identified within the EIS and mitigated. If such effects are not properly identified and mitigated, the desirability of the railine may be significantly eroded.

The risks associated with transportation of radioactive wastes through the County and City have been an important topic of local inquiry. The University of Nevada, Las Vegas Transportation Research Center was retained by the County to evaluate the risks of transporting waste by highway and by rail through the area.[37] The objective of this study was to determine whether or not the risk of transporting spent fuel was greater within Lincoln County than in other similar areas across the United States. The study did conclude that the total accident risk (person rem) in the County for rail and highway transport was significantly greater than that estimated for other like areas around the United States. Total risk associated with rail and highway waste transport in rural areas of the County was also found to be significantly than that estimated for other like areas across the United States. Although absolute levels of risk may be considered low, this study clearly indicates that residents of Lincoln County may be exposed to significantly greater levels of risk. The repository EIS must consider these differences as a means to ascertain viable options for reducing risk to levels commensurate with other regions of the United States.

A partial listing of other effects of the repository system which must be considered within the EIS follows:

Air Quality - fugitive dust, exhaust emissions: health effects to humans, flora and fauna

Climate -wind, rain, snow, ice, fog: effects on safe transportation

Hydrology - flash-flooding: effects on safe transport; construction effects on water quantity and quality, springs and existing wells

Geology - slope stability, seismic features, soils: effects on safe transport

Flora and Fauna - disruption and/or losses of vegetation and animals, particularly big game species of wildlife; replacement by invader species

Noise - significant changes from natural background levels

Viewshed - degradation of viewsheds

4.3 Characterization of Effects

To ensure that the repository EIS focuses upon those issues posing the most threat to existing environmental conditions, the County and City recommend that DOE seek to categorize prospective impacts as to their probability of occurrence and their degree of consequence. The results of this activity should be presented within a draft of the EIS Implementation Plan for review and input by affected parties. This course of action will help to encourage a draft NEPA compliance document which is most responsive to issues perceived important be stakeholders. In a study of potential repository system impacts, Lincoln County and the City of Caliente completed such an analysis regarding socioeconomic effects.[38] The results of the County and City assessment is shown in Tables 4 through 8.

5.0 COMPARATIVE EVALUATION OF ALTERNATIVES

The Notice of Intent (NOI) for the repository EIS implies the following hierarchy of alternatives will be evaluated within the document:

High Thermal Load
Intermediate Thermal Load
Low Thermal Load
    Construction
    Operation
        waste packaging
        - multi-purpose canisters
        - casks
        transportation
        - national
        100 percent truck
        most by rail, some by truck
        - regional
        rail corridors
        heavy-haul truck routes/intermodal transfer facility
        legal weight truck
    Closure/Post-closure
No Action

Based upon DOE's planned structure of alternatives, decisions the repository EIS will facilitate reaching appear to include:

1. Should the repository be designed and constructed to accommodate high, intermediate or low thermal loads?

2. Should site characterization activities at Yucca Mountain be terminated and spent nuclear fuel and high-level radioactive waste managed at generator sites?

3. Should waste be packaged in multi-purpose canisters or certified casks for transport and disposal?

4. Should transport from generator sites to Nevada be by truck or combination of truck and rail?

5. Should transport within Nevada be by rail, heavy-haul truck, and/or legal weight truck?

6. Which rail spur should be developed to provide access to Yucca Mountain?

7. Where should an intermodal transfer facility be located?

Table 4. Lincoln County Socioeconomic Impact Characterization Matrix
Site Characterization Phase

Probability of Occurrence	Low	High
High	increased tax revenues generated creation of new government agencies opposition from groups who oppose nuclear waste Tribal sovereignty issues	higher costs for government divisiveness within counties or county/state conflicts legal concerns
Low	increased traffic through Lincoln County/longer travel times lower air quality and more noise increased accident rates stigmatization	need for infrastructure development degradation of Lincoln County highways less retiree inmigrants a decline in visitation difficulty in marketing Lincoln County agricultural products

Consequence

Table 5. Lincoln County Socioeconomic Impact Characterization Matrix
Transportation System Construction Phase

Probability of Occurrence	Low Consequence	High Consequence
High	demands for higher community service standards increase in local demand for consumer goods and services increase in local business sales increased tax revenues generated necessity of budget amendments and short-term financing creation of new government agencies opposition from groups who oppose nuclear waste Tribal sovereignty issues unfavorable social consequences change in community cohesion	new direct basic employment new indirect basic employment union employment out of County workers brought in increase in population increased demand for public services need for infrastructure development increase in demand for housing increase in property values higher costs for government divisiveness within counties or county/state conflicts agricultural sector disruptions impairment of livestock grazing
Low	reduced demand for public services and community standards increased traffic through Lincoln County/longer travel times lower air quality and more noise increased accident rates stigmatization	new induced non basic employment County residents will leave to pursue job opportunities increase in vacancy rates downturn in the local economy lower demand for goods and services less tax revenues lower operating costs legal concerns degradation of Lincoln County highways the quality of life may diminish less retiree inmigrants a decline in visitation difficulty in marketing Lincoln County agricultural products

Table 6. Lincoln County Socioeconomic Impact Characterization Matrix
Transportation Phase

Probability of Occurrence	Low Consequence	High Consequence
High	creation of new government agencies opposition from groups who oppose nuclear waste Tribal sovereignty issues increased traffic through Lincoln County/longer travel times lower air quality and more noise increased accident rates	new direct basic employment union employment higher costs for government agricultural sector disruptions livestock grazing may be impaired necessity for the County to maintain a qualified radiological emergency response team divisiveness within counties or county/state conflicts stigmatization the quality of life may diminish less retiree inmigrants a decline in visitation difficulty in marketing Lincoln County agricultural products
Low	reduced demand for public services and community standards	increase in population increased demand for public services increase in government revenues increase in costs County residents will leave to pursue job opportunities increase in vacancy rates lower operating costs downturn in the local economy lower demand for goods and services less tax revenues generated risks of radiological exposure to water supplies accident resulting in radiological exposure legal concerns degradation of Lincoln County highways

Table 7. Lincoln County Socioeconomic Impact Characterization Matrix
Repository Construction Phase

Probability of Occurrence	Low Consequence	High Consequence
High	increase in population demands for higher community service standards increase in local demand for consumer goods and services increase in local business sales increased demand for public services need for infrastructure development increase in demand for housing increase in property values increased tax revenues generated higher costs for government necessity of budget amendments and short-term financing creation of new government agencies opposition from groups who oppose nuclear waste Tribal sovereignty issues unfavorable social consequences change in community cohesion	new direct basic employment new indirect basic employment union employment out of County workers brought in divisiveness within counties or county/state conflicts agricultural sector disruptions impairment of livestock grazing
Low	reduced demand for public services and community standards increased traffic through Lincoln County/longer travel times lower air quality and more noise increased accident rates stigmatization	new induced non basic employment County residents will leave to pursue job opportunities increase in vacancy rates downturn in the local economy lower demand for goods and services less tax revenues lower operating costs legal concerns degradation of Lincoln County highways the quality of life may diminish less retiree immigrants a decline in visitation difficulty in marketing Lincoln County agricultural products

Table 8. Lincoln County Socioeconomic Impact Characterization Matrix
Repository Operations Phase

Probability of Occurrence	Low Consequence	High Consequence
High	higher costs for government creation of new government agencies opposition from groups who oppose nuclear waste Tribal sovereignty issues increased traffic through Lincoln County/longer travel times lower air quality and more noise increased accident rates	new direct basic employment union employment divisiveness within counties or county/state conflicts stigmatization the quality of life may diminish less retiree inmigrants a decline in visitation difficulty in marketing Lincoln County agricultural products
Low	reduced demand for public services and community standards increase in population increased demand for public services increase in government revenues	County residents will leave to pursue job opportunities increase in vacancy rates lower operating costs downturn in the local economy lower demand for goods and services less tax revenues generated risks of radiological exposure to water supplies accident resulting in radiological exposure legal concerns

8. Which heavy haul access routes should be utilized?

9. Which routes should legal weight trucks utilize?

It is not immediately apparent what NEPA required comparisons DOE will develop to facilitate selection of one alternative over another. The County and City will consider the repository EIS insufficient if it does not contain comparative analyses of sufficient detail to reach conclusions about each main and sub-alternative considered.

Review of the NOI leaves the County and City concerned that the repository EIS will not address the environmental implications of a decision to proceed with construction and operation (the choice between No Action and repository development), but rather will conduct evaluations focused at supporting decisions between repository design and operation alternatives. While such decisions are necessary, it is imperative that the EIS thoroughly describe the impacts of repository development upon the affected environment. This analysis should include a comparison of consequences resulting from selection of one thermal load design over another. In addition, comparison within the EIS of various transportation routes and modes should be supported by analyses contained therein.

Beyond those alternatives defined within the NOI as outlined above, the repository EIS should also provide comparative evaluations sufficient to answer the following questions, among other possibilities:

1. Should emplacement of waste packages be vertical or horizontal?

2. To what capacity should the repository be designed and operated (ie. 70,000, 100,000, or more metric tons of uranium).

3. What materials should waste packages be constructed of?

4. How long should wastes remain retrievable?

5. Which repository design strategy enhances waste retrieval capability most?

6. How long should repository performance be monitored before initiation of closure?

7. Which repository design enhances closure capability most?

8. What materials should be used to accomplish closure?

9. What mode of transport should be planned to support possible retrieval activities?

10. What rail construction standard should be adopted?

11. How do alternative rail construction schedules serve to enhance positive and minimize negative socioeconomic impacts?

12. Should the rail spur be operated by DOE, a contractor, or combination thereof?

13. Should the rail spur be owned by the private sector or government?

14. Where should cask maintenance facilities be located?

15. Where should rail spur operations and maintenance facilities be located?

16. Where should the OCRWM transportation operations center be located?

17. Where should borrow pit and other material source sites to support rail construction be located?

18. What are the advantages and disadvantages to local economies of application of union versus non-union employment requirements for repository system construction and operation?

19. What technology should be used for shipping container handling at the intermodal transfer facility (ie. rubber tire mounted vs, overhead crane)?

20. Should special trains be used or should wastes be transported along with other commerce on regular trains?

21. How long should rail and intermodal transfer facilities be maintained and available for DOE use following last receipt of waste at the repository?

22. What are the advantages and disadvantages of shared use of the rail spur?

The alternatives outlined by DOE in the NOI do not provide sufficient coverage of

the breadth of decisions which must be made by the Department. Failure by the Department to develop a comprehensive list of all such decisions (as items 1 - 22 above serve to illustrate) prior to completion of the draft EIS may result in production of a document whose conclusions may be illconceived and too narrow to enable implementation. Lincoln County and the City of Caliente recommend that DOE include a comprehensive list of decision questions within a draft of the EIS Implementation Plan. Based upon the variety of decisions which the document needs to support, the Plan can then address the appropriate scope and methods of analysis. The Plan should detail the types of comparisons which will be required to support repository system development and operation decisions.

The EIS Implementation Plan should include a detailed discussion of the factors which will be utilized by DOE in making comparisons between all decision choices which the document will be intended to support. To the maximum extent practical, such factors should be subjective to facilitate independent review.

6.0 MITIGATION OF EFFECTS

Assuming that DOE has prepared a comprehensive assessment of the environmental consequences of developing and operating the repository system in Nevada, priorities and opportunities for mitigation should be readily apparent. NEPA regulations require that DOE identify and evaluate all potentially feasible options for mitigation of impacts. Mitigation measures should not be eliminated from consideration in the EIS because they are outside the jurisdiction of the lead agency or because they are not likely to be adopted or enforced by DOE. The probability of each mitigation measure being implemented must be addressed within the EIS. (40 CFR 1502.16 (h), 1502.2) Five categories of mitigation which must be considered by the Department include avoidance, minimization, rectification, reduction and compensation. Lincoln County and the City of Caliente will consider DOE proposed mitigation measures of the following types to be insufficient:

1. "DOE will consult with..."
2. "DOE will conduct further studies..."
3. "DOE will prepare a plan to mitigate..."
4. "DOE will strive to protect the resource..."
5. "DOE will monitor the problem..."
6. "DOE will submit a recommended solution for review by..."

These types of paper mitigation measures will not solve the environmental problems which will be identified within the repository EIS. NEPA regulations require mitigation

measures which will result in physical avoidance, minimization, rectification, reduction or compensation of impacts.

Because there can be no question that development and operation of the repository system in Nevada will result in significant effects, NEPA requires that all of the specific impacts of the system (whether or not "significant") be considered, and where feasible, related mitigation measures developed. (40 CFR 1502.14(f), 1502(h), 1508.14). The County and City encourage DOE to identify mitigation measures both by type (ie. avoidance) and by waste system component and phase. Every effect on the existing environment should have a corresponding set of mitigation options identified within the EIS.

6.1 Avoidance

Where possible, DOE should seek to mitigate repository system effects by avoidance of impact receptors. With regard to impacts of transportation, this may be more possible for rail routing than for use of existing roadways. For example, rail alignment adjustments might be made to avoid impacting archaeologic or historic sites. Avoiding the impact involves not taking certain action or parts of an action.[39]

6.2 Minimization

By limiting the degree or magnitude of repository system component implementation, DOE may be able to effectively minimize certain effects. For example, by limiting use of subsidized bussing from the Las Vegas area, DOE may be able to encourage repository system workers to reside in facility host communities and thereby mitigate disequitable distributions of risk and economic benefit.

6.3 Rectification

In some cases, DOE should consider repairing, rehabilitating, or restoring the affected environment to achieve mitigation. An obvious example of mitigation through rectification would be revegetation of unused areas disturbed during rail spur construction. Alternatively, DOE might propose construction of passing lanes in areas where slow moving heavy haul trucks may encourage dangerous passing.

6.4 Reduction or Elimination

Through preservation and maintenance activities, DOE may be able to effectively reduce or eliminate certain impacts of the repository system. Improvement of existing roadways damaged by legal weight and heavy-haul trucks is an one example of how DOE might reduce or eliminate certain transportation impacts.

6.5 Compensation

In some cases, it will not be possible for DOE to apply previously described types of measures to mitigate impacts. For example, lost forage for livestock and wildlife will be unavoidable in the construction of a rail spur. DOE should, in conjunction with the Bureau of Land Management, design and implement range improvements (ie. seedings or vegetative treatments) to compensate for lost forage. Disruptions to livestock and wildlife movement and loss of access to water sources might be compensated through inclusion of undercrossings and development of new water sources. Where development and operation of repository system components results in increased population within small communities (typical of Lincoln County), DOE might consider financial compensation (grants or loans) provided in advance of effects as a means to help such communities cope with growth. In addition, initiatives to target repository system procurement opportunities at Lincoln County businesses should be considered as compensatory measures.

6.6 Evaluation of Alternative Mitigation Measures

Lincoln County and the City of Caliente are concerned that DOE not simply evaluate prospective mitigation measures from a cost basis. Rather, the County and City believe that full consideration of options for mitigation will include evaluation of Implementability, cost, effectiveness, and acceptability. Selection of measures for implementation should be based upon a comparative evaluation which considers the aforementioned factors.

7.0 DOE PROCESS FOR NEPA COMPLIANCE

If the repository EIS is to serve as an effective decision-support document pursuant to Council On Environmental Quality (CEQ) and DOE regulations for implementation of NEPA, it is imperative that the Department follow a compliance process which maximizes affected party participation. Failure by DOE to afford affected parties every opportunity to aide in shaping the draft EIS and resultant Record of Decision will serve to broaden the predictable stable of stakeholders likely to challenge the legal sufficiency of the document. DOE may be able to mitigate this potential by electing, in as many cases as possible, to exercise Departmental discretion enabling affected party participation. The County and the City believe that favorable application of DOE discretion in this regard must be applied to the EIS Implementation Plan, Draft Repository EIS, and Record of Decision.

7.1 EIS Implementation Plan

DOE is to be commended for its intent to prepare an EIS implementation plan. The breadth and complexity of decisions which need to be supported by the EIS and issues requiring evaluation, suggest the merits of extensive planning on what to include and the

approach to inclusion of required information. DOE should not see the EIS Implementation Plan as simply a necessary compliance step. Rather, the Department should view the Plan as an opportunity to develop a comprehensive road map on how to arrive at a NEPA compliance document which supports decision-making and is most readily defensible. Because development and operation of the repository system will effect a varied landscape of ecological, social and economic conditions throughout Nevada, development by DOE of a truly useful EIS implementation Plan will clearly benefit from iterative input from stakeholders. To ensure that the Plan reflects important priority issues and an adequate scope of work for needed analyses, the County insists that DOE allow review and comments on a draft of the repository EIS implementation plan. Admittedly a discretionary act on the part of DOE, allowance of public review and comment on the draft EIS Implementation Plan will build public confidence in the NEPA compliance process and improve the quality of the EIS document.

7.2 Draft EIS Review

Following preparation of the draft EIS, Lincoln County requests that DOE hold hearings on the document, with at least one such hearing held in Lincoln County. DOE should plan on allowing at least 90 days for review and submission of comments on the draft EIS. All supporting documents included by reference within the EIS should be made available by DOE at numerous locations for review by interested parties.

7.3 Record of Decision

It is imperative that any and all feasible mitigation measures identified during preparation of the EIS be included in the Record of Decision to be developed subsequent to completion of the EIS. The Record of Decision must include the following: statement explaining the decision; explanation of alternatives that were considered and those that are environmentally preferable; factors considered by DOE in making its decision; explanation of which mitigation measures, if any, were adopted, and if mitigation measures were not adopted, an explanation of why not; and a monitoring and enforcement program for any adopted mitigation measures. (40 CFR 1505.2) Lincoln County will take a dim view of a DOE decision to only address mitigation apart from the Record of Decision, for example in a stand-alone mitigation plan. Lincoln County places great significance upon the institutional and legal stature of the Record of Decision. The County believes that commitments to mitigation not contained within the Record of Decision will not be commitments at all.

8.0 REFERENCES

In addition to the many reports referenced in the Endnotes section of this document, Lincoln County and the City of Caliente have sponsored many other studies which describe baseline and postulated with repository conditions within the County. The

County and City suggest that DOE review and as appropriate rely upon these studies in preparing the repository EIS. Use of these documents will serve to make the EIS more reflective of and responsive to local conditions within Lincoln County. A listing of reports by fiscal year completed sponsored by the County and City follows:

FY 85
Lincoln County/City of Caliente Emergency Preparedness Inventory and Analysis

FY 86
Characteristics of the Labor supply and Commuting Patterns of Workers Within Lincoln County

Pilot Study and Analysis of Forty-Six Mile Rail Corridor in Lincoln County, Nevada

FY 87
Study of Methods to Value, Assess and Distribute the Ad-Valorem Component to the Grants-Equal-To-Taxes Provisions of the Nuclear Waste Policy Act of 1982

FY 88
Rachel Resource Inventory

Estimated distribution of Materials, Equipment and Service Expenditures at the Proposed Repository Site

Business Directory: Lincoln County, Nevada

Lincoln County Procurement Workshop Handbook

FY 89
Evaluation of Alternative Rail Corridor Routes through Lincoln County to the Yucca Mountain Repository Site

Rachel Area Conceptual Development Plan

Condition Update of Forty-Six Mile Rail Corridor in Lincoln County, Nevada

Radiological Emergency Response in Small Communities: A Report on Capabilities and Constraints

Lincoln County General Fund Fiscal and Operational Assessment

FY 89 Cont'd.
Evaluation of big Spring as an Alternative Water Supply to the City of Caliente

City of Caliente, Nevada Railroad Crossing Alternatives: Phase I

FY 90
Lincoln County Regional Transportation Commission Capital Improvements Plan

A Nevada Local Government Perspective of European Nuclear Waste Management

Alamo Area Resource Inventory

Alamo Land Use Plan

Risk Perceptions of the Yucca Mountain Repository: A Comparative Assessment of Caliente and Other Southern Nevada Communities

Characteristics of the Labor Supply in Lincoln County Communities

Fiscal Assessment and Capital Improvements Program: Caliente Public Utilities

FY 91
1991 Lincoln County Overall Economic Development Plan

Water Supply and Demand of Various Lincoln County Community Areas

City of Caliente, Nevada Railroad Crossing Alternatives: Phase I Amended Report

Water System Capital Improvements Plan: Alamo Water and Sewer General Improvement District

Media Amplification of Risks: Implications for Hazardous Materials Transport

Lincoln County Emergency Preparedness Inventory and Fiscal Analysis

Caliente Masterplan Evaluation and Update

Panaca Water System Capital Improvements Plan

Information Content, Signals and Sources Concerning the Proposed Repository at Yucca

FY 91 Cont'd.
Mountain: An Analysis of Newspaper Coverage and Social-Group Activities in Lincoln County, Nevada

FY 92
Preliminary Impact Scoping Report

Lincoln County Master plan Evaluation and Update

Lincoln County/City of Caliente Emergency Preparedness Inventory and Fiscal Analysis Update

FY 93
Summary of Findings and Recommendations: Lincoln County Fiscal and Operational Assessment; Caliente Fiscal and Operational Assessment; and Fiscal Assessment and Capital Improvements Program for Caliente Public Utilities

Lincoln County Procurement Outreach Program Development Plan

Tourist Visitation Implications of the Accident at Three Mile Island: Implications for Yucca Mountain

1993 Lincoln County Fiscal and Operations Assessment Update

Tourism Impacts of TMI and Other Adverse Events: Implications for Lincoln County and Other Rural Nevada Counties Bisected by Radioactive Waste Transport Corridors

FY 94
1993 Lincoln County Labor Market Survey

Risk Analysis for Spent Nuclear Fuel Transportation Through Lincoln County

Retail Sales Analysis for Lincoln County, Nevada

Economic Trends and Development Strategies for Lincoln County

Host Area Diversification at Contractor-Operated Department of Energy Facilities

Baseline Inventory of Tourism Assets

FY 94 Cont'd.

Feasibility and Methods for Assessing Cumulative Radiological Exposure Risks Associated with Department of Energy Activities at the Nevada Test Site

The Yucca Mountain High-Level Radioactive Waste Repository and Lincoln County: Characterization of Socioeconomic Impacts and Framework for Assessment of Effects

1993 City of Caliente Fiscal and Operations Assessment

FY 95

Economic Impact Model for Lincoln County

Lincoln County Economic/Demographic Database

Lincoln County Fiscal Model (spreadsheet)

Public Opinion Polling and the Yucca Mountain Controversy: A Seven Year History

Lincoln County Emergency Response Issue Ranking (Technical Memorandum)

Copies of these reports can be obtained from the Lincoln County Nuclear Waste Project Office.

Endnotes

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