

***Issues Identification Report for the
Carlin Rail Route Option***

**Prepared for the Eureka County Board of Commissioners
by Planning Information Corporation
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Executive Summary

This report outlines an initial determination of issues related to the development of a new rail line (the "Carlin route option") through Eureka County to transport high-level nuclear waste to the Yucca Mountain repository. Because of the uncertainties surrounding the development of the repository, and the fact that transportation planning is in an early stage, Eureka County has the opportunity to engage the U.S. Department of Energy in the design and development of the Carlin route option.

The following figures illustrate the issues described in detail in the report. Figure I shows the initial design criteria considered by DOE in preliminary corridor selection.

Figure I -- Summary of Corridor Identification/Selection Issues Considered by DOE

Issue	Criteria
Existing & Abandoned Railroads	Working railroads and historical routes indicate some, not all, potentially feasible corridors.
Terrain	Corridor would offer potential alignments which have a maximum grade of 2.5% and a maximum curvature of 8 degrees.
Land Ownership/Land Use	Corridor would offer potential alignments which maximize use of federal land with low potential for land use conflict, minimize use of private land, and avoid the Nevada Test Site and Nellis Air Force Range.
Regional Railroad Access	Corridor would offer potential alignment intersecting one or more mainline railroad.

Figure II shows the issues considered by DOE in selecting specific alignments within a corridor. Figure III shows the issues that must be considered under the National Environmental Policy Act in preparing an environmental impact statement for rail development on federal land.

Figure II -- Summary of Alignment Identification/Selection Issues Considered By DOE

Issue	Criteria
Terrain	Identified alignments must have maximum 2.5% grade and maximum 8 degree curvature.
Impacts	Potential alignments maximize use of compatible lands and minimize mitigation of land use and environmental impacts.
Costs	Potential alignments minimize costly construction and operating solutions.

Figure III -- Summary of Critical EIS Impact Topics Identified By Law

Issue	Criteria
Air Quality	Clean Air Act
Areas of Critical Environmental Concern (ACEC)	Federal Land Policy and Management Act
Cultural Resources	National Historic Preservation Act
Prime/unique Farm Lands	Surface Mining Control and Reclamation Act
Floodplains	Executive Order 11988
Native American Religious Concerns	American Indian Religious Freedom Act
Threatened/Endangered Species	Endangered Species Act
Hazardous/Solid Wastes	Resource Conservation and Recovery Act; Comprehensive Environmental Response, Compensation and Liability Act
Drinking/Groundwater Quality	Safe Drinking Water Act, Clean Water Act
Wetlands/Riparian Zones	Executive Order 11990

Wild/Scenic Rivers	Wild and Scenic Rivers Act
Wilderness	Federal Land Policy and Management Act, Wilderness Act

Figure IV shows some of the issues that would be of particular concern to citizens of Eureka County if the Carlin route is developed as indicated in the Preliminary Rail Access Study.

Figure IV -- Summary Of Issues Of Potential Concern In Eureka County

Issue	Criteria
Surface/Ground Water	Development may disturb environmentally or economically sensitive water resource
Floodplain	Development in floodplain is discouraged by county policy
Wetlands	Development may disturb environmentally or aesthetically sensitive resource
Game Habitat	Development may disturb economically or socioculturally sensitive resource
Protected Species	Development may disturb environmentally or aesthetically sensitive resource
Socioeconomics	Population, employment, income, facilities and services effects during construction and operation
Crop Production	Disruption of operations, transportation access
Grazing	Disruption of operations, transportation access
Mining	Disruption of operations, discourage development, transportation access
Economic Development Potential	Standard or stigma effects may advance

	or retard economic development goals
Emergency Preparedness	Relative cost to meet standards of actual or perceived preparedness
Fiscal	Net short- long-term fiscal impact
Sociocultural/Lifestyle	Disruption of rural/agricultural community

The report concludes with a recommendation that Eureka County establish and maintain a procedure to interact with the citizens of the county and with DOE in promoting the county's interests in the design and development of the Carlin route option.

Introduction

Potential transportation modes and routes, including regional highway and rail options that may be used to transport high-level wastes to the site of a potential Yucca Mountain repository, are being studied in Nevada by the U.S. Department of Energy (DOE). According to DOE, highway routes will be identified from among existing highways in accordance with current U.S. Department of Transportation (DOT) regulations. However, the potential repository site in Nye County, Nevada currently lacks rail service and an existing railroad right-of-way. Therefore, DOE has been investigating the development of a railroad through a number of potential corridors.

A DOE Preliminary Rail Access Study (U.S. Department of Energy 1990) discussed selected aspects of the rail transport option. The report identified ten broad corridors from various railheads to the repository site. [Figure 1](#) shows the approximate alignment of the major rail options, together with existing rail lines in Nevada and California. Included among the preliminary corridors is the so-called Carlin route option which would bisect Eureka County.

DOE's stated intent is to give affected units of local government, including Eureka County, an opportunity to participate in the development of the rail transport option. Consequently, Eureka County has initiated a program of study to develop its own analysis, formulate policy, and interact directly with DOE with respect to the potential development of a rail spur within Eureka County. The purpose of the first task in the program of study has been to identify areas and issues of potential environmental and socioeconomic concern that warrant further study in subsequent tasks and to provide recommendations on prioritizing the concerns. This report presents the results of the first task.

The remainder of this chapter provides an overview of DOE's rail access studies and descriptions of existing and abandoned rail routes in central Nevada. Chapter 2 describes the Carlin route option as it currently stands and the current status of the route in DOE's study process. Chapter 3 identifies issues for consideration by Eureka County now and as DOE's rail access study progresses. Conclusions are presented in Chapter 4. Chapter 5 includes both references cited as sources in the text and general references that may be of interest to the reader. Overlay maps plotted on transparency film sheets have been provided to the Eureka County Yucca Mountain Information Office for use in exploring the interaction of the route with selected combinations of socioeconomic and environmental characteristics of Eureka County.

Figure 1 – Existing Rail Lines and DOE Rail Option- Affected counties in Nevada and

California



Overview of DOE's Rail Access Study

DOE studies of potential rail access to Yucca Mountain are still in an early stage. To date, they

have focused on the physical planning and analysis of route options and collection of data on rail accident risks. Socioeconomic and environmental issues associated with route options have only been considered in a preliminary fashion. "Town Forums," sponsored by Eureka County, were held in the towns of Eureka and Crescent Valley, Nevada, in the second half of fiscal year 1992 (U.S. Department of Energy 1992, p. 2-23), but local issues have not yet been fully worked into the DOE analysis.

Under the Nuclear Waste Policy Act (NWPA), as amended, DOE, through the Office of Civilian Radioactive Waste Management (OCRWM) would design, develop, and implement a system for the transportation of high-level nuclear waste from commercial reactors and DOE facilities to the Yucca Mountain repository or to other facilities in the waste management system. The base for a nuclear waste transportation system already exists, according to DOE, in the form of procedures and technologies used by DOE, electrical utilities, and the transportation industry. New transportation equipment, procedures, and infrastructure will be developed by OCRWM as necessary. This includes cask development and operational procedures, including the physical transport of the waste from the source to the repository.

Transportation activities in Nevada are focused on the development of rail access to the Yucca Mountain site, evaluations of potential transportation impacts in Nevada, coordination with other DOE transportation activities, and response to transportation issues raised in Nevada. A Nevada Transportation Studies Plan will be developed to describe these activities (U.S. Department of Energy 1990, p. 2).

To date, the Nevada Transportation Studies have been hampered by under-funding. Funding levels requested for fiscal year 1994 are adequate to maintain a minimal staff, participate in outreach activities, attend meetings, and monitor and provide input to national programs, including the national transportation and cask development programs. The effect of under-funding on rail access studies has been to delay further investigation of route options, including the Carlin route option (Grassmeier 1993).

Historical and Existing Rail Routes in Central Nevada

Two main line routes, one owned by the Southern Pacific Transportation Company (SP) and one owned by the Union Pacific Railroad (UP), operate in central Nevada. Nevada's only remaining shortline railroad, the Nevada Northern, also is located in central Nevada. DOE's studies to date have considered the location of existing and now-abandoned railroads, as one factor among several, in order to identify potential rail access options to Yucca Mountain (U.S. Department of Energy 1990, p.3).

Rail experts advise caution when considering a historical rail route as an option for development today. For one thing, many historical rail routes of central Nevada were narrow gauge railroads whose engineering requirements were significantly different from those of a modern standard gauge railroad. For another, conditions along a historical rail route — in terms of land ownership, land use, and the natural environment — may be significantly different today than in the past. Also, many current concerns regarding rail alignment were not considered in the past (Standish

1993).

Nevertheless, historical rail routes are part of the background for a rail access study. Because the mountain ranges in Nevada are predominantly north and south, north-south routes generally have more favorable topography for railroad construction than east-west routes. Sections 1.2.1. through 1.2.4 describe the historical north-south routes that take off from the Humboldt River Valley between Battle Mountain and Wendover. The routes are illustrated in [Figure 2](#). Sections 1.2.5 through 1.2.7. describe existing railroads in central Nevada -- the SP, the UP, and the Nevada Northern Railway.

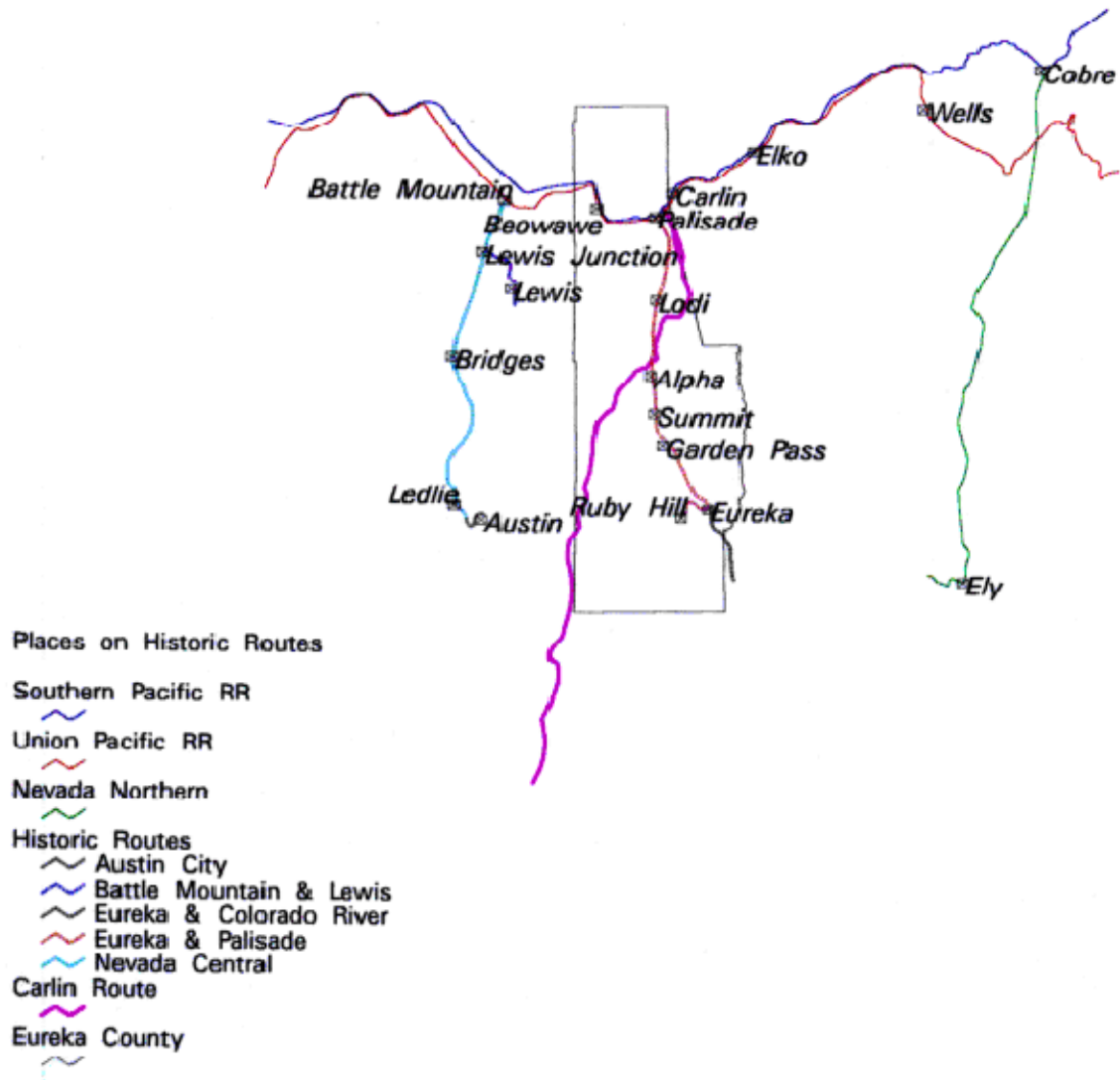
Eureka & Palisade Railroad

Of the historical north-south shortline railroads, only the Eureka & Palisade Railroad passed through Eureka County. For about half the distance traveled in Eureka County, the Carlin route roughly parallels the historical railroad, a narrow-gauge that fed traffic to the SP and then Western Pacific (WP) trunk lines in the Humboldt River Valley. The Eureka & Palisade was completed in 1875. Reorganized as the Eureka Nevada Railway in 1912, the railroad finally was abandoned in 1938 (Myrick 1962).

Nevada Central Railroad

A second historical north-south route taking off from the Humboldt corridor to the west of Carlin was the Nevada Central Railroad, a narrow-gauge from Battle Mountain to Austin. This railroad was completed in 1880 and abandoned in 1937 (Myrick 1962). Late in its existence, a southward extension of the Nevada Central was proposed as part of a plan to join six Nevada shortlines into one system to be called the Mid-Pacific Railroad. The proposed extension, named the Los Angeles & Nevada Railroad, would have run from Ledlie (west of Austin) to Millers (west of Tonopah) on a route passing through the Ione Valley, crossing the Ione Mountains at Railroad Pass, and then down the Reese River Valley. As proposed, the route would have included a 1.4-mile tunnel at the summit of the pass. However, the Mid-Pacific Railroad promotion never proceeded beyond the stage of a thoroughly researched report presented to prospective developers in 1932 (Myrick 1962).

Figure 2 - Historical Rail Routes in the Vicinity of the Carlin Route



Historical Nevada Northern Railway

A third rail route, located to the east of Carlin, is the Nevada Northern Railway, a standard gauge completed in 1906. The Nevada Northern was operated until 1983 by Kennecott Copper, successor to the railroad's original developer, Nevada Consolidated Copper Co. The Nevada Northern right-of-way from the mainline to the vicinity of Cherry Creek was purchased from Kennecott to ensure rail access to a coal fired power plant planned for the Cherry Creek Valley sometime in the future. The trackage is owned by the City of Los Angeles Department of Water and Power (DWP). Kennecott donated the Ely depot, several miles of track, and the railroad rolling stock to the City of Ely in 1983. These remnants of the Nevada Northern in Ely are operated today as a museum and excursion route (Northeastern Nevada Recreation Guide 1993).

Historical Cortez Mines Adjunct

One more historical railroad operation is worthy of mention, in spite of its small size. Cortez Mines, Ltd., operated an isolated mine-to-mill railroad near Tenabo, in the Crescent Valley in Lander County, about 30 miles southeast of Battle Mountain and about 20 miles south-southwest of Beowawe. Solely an adjunct to mining operations, a single locomotive (built in 1890) moved cars over less than a mile of track, long since abandoned (Myrick 1962). The locomotive may be seen today in front of a casino in Clark County on the road to Hoover Dam (Wyatt 1993).

Overview of Existing Railroads in Central Nevada

The SP operates the Overland Route serving Reno/Sparks, Winnemucca, Battle Mountain, and Elko, with branches to Fallon and near Hawthorne. The UP owns the Feather River Line, the former Western Pacific Railway (WP) route, which runs parallel to the SP overland route through central Nevada. A short branch of the Feather River Line extends to Reno. The former Nevada Northern Railway trackage also exists between the mainline and Ely.

SP and UP Joint Trackage Segment

Between Weso, just east of Winnemucca, and Alazon, just west of Wells, the SP and UP operate joint trackage. The segment essentially functions as double track with eastbound trains of both companies normally using UP rails and westbound using the SP line. East of Weso, the UP and SP follow the Humboldt River Valley, with the UP line initially on the north side of the river. Just east of Barth, the Humboldt River flows through Palisade Canyon. There the two railroads are forced close together, and the two lines switch sides of the river, with the UP "flying over" the SP. In the next 20 miles, the railroad passes through four short tunnels necessitated by the canyon walls. Curves in the canyon limit train speeds to 45 mph. The UP remains to the south of the SP the rest of the way to Alazon, although the two railroads remain in close proximity.

Other operating characteristics of the main lines in the joint trackage segment are as follows: Carlin is a crew change point for the SP and the site of a small freight yard; Elko is the change point for UP crews and also the site of a small freight yard. In the joint trackage segment, the lines are block signalled only for the direction of traffic, and reverse movements are rare. Although the railroads are roughly parallel, their rights-of-way often diverge for several miles. The UP line is slightly shorter than the SP line (178.2 versus 183.0 miles). Crossovers to allow detour movements are located at points where the lines are in proximity (U.S. Department of Energy

1991, p. I-1-12).

Existing Nevada Northern Railway

As noted above, the City of Los Angeles DWP owns the former Nevada Northern railway, which extends northward from Ely to connect with the UP at Shafter and the SP at Cobre. Although not officially abandoned, this line has not been operated since 1983 when the copper industry around Ely shut down. The line is mothballed pending the construction nearby of a DWP generating station, which will receive trainloads of coal. The trackage still exists, although it would require rehabilitation and upgrading for use in the future.

Besides being intended for coal train use by the current owner, the upper portion of the Nevada Northern right-of-way (about 92 miles) is identified by the DOE as potentially part of the Cherry Creek Rail Route Option, Option 9, for access to Yucca Mountain (U.S. Department of Energy 1990).

Status of the Carlin Rail Route Option

Unlike the Caliente route option, which was taken to the conceptual design level in 1990 (De Leuw Cather 1991), the Carlin route option remains a corridor, not a specific route alignment. Therefore, the resolution of many issues, not the least of which are whether the Carlin route ultimately may be replaced by another viable rail access corridor and whether rail access will be pursued at all by DOE, is not expected for some time. This chapter describes the Carlin route option as it currently stands, the status of the Carlin option in the DOE rail access study process, and what may be expected in future consideration of rail access to Yucca Mountain.

The Carlin Rail Route Option

DOE explored several areas for the Carlin route option (referred to as "Option 8") in order to obtain access to Yucca Mountain from the paired trackage of the SP and UP between Wells and Winnemucca in northern Nevada. The following sections provide, first, an overview of the full extent of the Carlin route option, which traverses Eureka, (possibly) Elko, Lander and Nye Counties; and second, a more detailed description of the Carlin route option as, in its present form, it would traverse Eureka County.

Overview

According to DOE's Preliminary Rail Access Study, the checkerboard pattern of private and public land ownership surrounding the railroads across northern Nevada made complete avoidance of private land difficult, leading to a suggested "minimum impact departure point" from the UP/SP paired trackage to be located about five miles west of Carlin. The initial segment passes through "terrain ... so rugged that private developers were uninterested in the land, and as a result, the greater portions of the terrain were left in Bureau of Land Management (BLM) ownership," according to DOE (U.S. Department of Energy 1990, p. 21).

The initial segment proceeds parallel to Nevada State Highway (SH) 278 along the border of Eureka and Elko counties. To minimize contact with private land, the base route would traverse a rugged ridge east of the highway. An alternative ("Option 8A") for an eight-mile portion of the route would be located farther west, beginning about six miles south of the mainline. Although DOE says Option 8A would present much less engineering difficulty than the base route, the alternative would require use of private land closer to SH 278 (U.S. Department of Energy 1990, p. 21).

About 45 miles south of its departure from the mainline, the Carlin option would leave the vicinity of SH 278 and pass southwesterly into the Monitor Valley, crossing U.S. Highway 50 into Lander County. It would follow the Monitor Valley into Nye County and continue on through the Ralston Valley to a junction with the Caliente route south of US 6, about 12 miles east of Tonopah.

As developed in the Preliminary Rail Access Study, the base Carlin route is approximately 365 miles long. About 95 miles of the base route would be in Eureka County.

The Carlin Rail Route Option in Eureka County

The path of the proposed Carlin route within Eureka County, as described here, was approximated

based on maps produced by De Leuw Cather as part of the Preliminary Rail Access Study (De Leuw Cather 1991). As such, it does not purport to represent a detailed analysis of feasibility, NEPA compliance, or other considerations, but is used merely as a graphical illustration for use in this discussion.

The Carlin route would depart from the UP/SP paired trackage near the community of Palisade in northeastern Eureka County at a point about halfway between the county line and Palisade. Although it is difficult to determine the exact point of intersection from the maps produced by De Leuw Cather, it appears to be in the vicinity of the Raine Ranch, at a point where the UP and SP rail lines converge to the north of the Humboldt River after emerging from a pair of tunnels. If the route begins to the east of these tunnels, one or more tunnels would be required for the Carlin route to enter Pine Valley to the south; if the route begins to the west of these tunnels, the route would travel through the Raine Ranch's irrigated fields immediately to the south of the Humboldt River, along Pine Creek.

Because the route passes through narrow portions of Pine Valley in the northern segment of the route, it may be difficult to establish right-of-way fences that avoid the highway's right of way. Assuming the route travels through the Raine Ranch property, the route would generally follow Pine Creek on the east side of SH 278, beginning just to the north of mile marker 78. At several points in the first few miles of the route, DOE would encounter one or more choices among several alternatives: significant grade changes; construction through irrigated or otherwise valuable pastures and hay fields; grade crossings on SH 278 (although none is shown on this segment of the route on the conceptual map); and construction on the alluvial fan.

Beginning at a point about six miles south of the mainline, the base alignment (Option 8) travels southeast into Elko County near the Tomera Ranch and then back into Eureka County near the Bailey Ranch; the alternative alignment (Option 8A) travels more southerly to the east of SH 278, totally within Eureka County. The two options converge about eight miles south-southeast of the point of divergence. In addition to the moderate cut-and-fill potential along the entire route, DOE's alignment choices as described above would persist at least to a point immediately to the east of SH 278 at about mile marker 68, where Option 8A is shown to depart gradually from the highway along the alluvial fan to the south-southeast. The route would then approach the Elko County line just east of the Slanowski Ranch, to its maximum eastern extent under Option 8A at a point where the options converge, then back to the southwest through several washes toward SH 278. Between mile markers 51 and 52 near Sheep Creek Road, the route would travel due west, cross the highway, and then veer to the southwest parallel to the highway about a quarter-mile to the west for about four miles. For the next six miles, the route would gradually turn to about a mile west of the highway, until it crosses J-D Ranch and West Road, or County Road (CR) M-111.

At this point, the route veers more sharply to the west and west-southwest, crossing Henderson Creek about two miles south of the J-D Ranch. From this point, the route travels southwest through the Denay Valley, crossing Roberts Creek Road (CR M-108) about two miles east of Denay Creek near Tonkin Springs. From there, the route continues parallel to CR M-108 toward Tonkin Summit. The climb up Tonkin Summit begins at an elevation of about 6,553 feet and reaches an elevation of 6,938 feet at the summit over the space of about 2.3 miles, an average

grade of 3.2 percent along the road. In the last half mile of the ascent, the average rate reaches about 4.4 percent. If DOE adheres to the maximum grade of 2.5 percent, the Carlin route would have to depart from the road to the summit, requiring a number of bridges and substantial cut and fill along the route.

After reaching Tonkin Summit, the route parallels the Bartine to JD Ranch Road (CR M-107), descending into the Monitor Valley. After descending, the route turns to the south, continuing about one to two miles west of CR M-107, crossing a series of creeks, past 3-Bar Ranch and then past Atlas Gold Bar Mine, both to the east of the route. After passing the mine, the route veers more to the south- southwest, then south through Bean Flat, crossing US 50 about one mile east of the Lander County line, entering Lander County about three miles south-southwest of the US 50 crossing.

The DOE Rail Access Study To Date

The DOE rail access study process began with the Preliminary Rail Access Study, which evaluated ten potential rail route options and recommended three options for further study. Subsequently, work progressed sufficiently to complete a conceptual design for the Caliente route, including preliminary alignment and costs. However, budget constraints and an emphasis on characterization of the Yucca Mountain site itself have curtailed DOE's conceptual design efforts since work was conducted on the Caliente route. The following sections provide an overview of DOE's Preliminary Rail Access and Conceptual Design studies and how they affect the current status of the Carlin route option.

Preliminary Rail Access Study

The Preliminary Rail Access Study (U.S. Department of Energy 1990) used several criteria to identify general areas offering potential Yucca Mountain rail access route options. Reconnaissance of this information base led to the identification of ten route options. Once potential route options were identified, the options were evaluated according to somewhat more specific criteria. Alternatives within each major option were also developed wherever possible during the Preliminary Rail Access Study. Two alternatives were identified within the major Carlin route option and were given some consideration. One alternative avoids most private lands but crosses rugged terrain; the other trades a more favorable topography for potentially more conflict with private lands.

The first stage of the process described above led to the inclusion of the Carlin Rail Route Option as one of ten major rail options to be given a preliminary evaluation. The second stage of the process led to the recommendation, based on the preliminary evaluation, that the Carlin route — named Option 8 — and two other route options, Option 3 - Jean, and Option 7 - Caliente — be subjected to further study at the level of a "conceptual design study." The initial identification of ten potential route options and the selection of three for further study represent the outcome of the Preliminary Rail Access Study.

The choices reflect a determination by DOE that each of the three selected route options offers the potential to find an alignment within the general route corridor that is feasible in engineering

terms and has less potential land use conflict relative to the other seven route options. In addition, it was noted that among the three selected route options, the Carlin route offers a potential direct linkage to two regional railroads, in contrast to the other two route options that are linked to only one regional railroad (U.S. Department of Energy 1990, p. 32).

Conceptual Design Report

Following the completion of the Preliminary Rail Access Study, conceptual design study of the Caliente route was conducted. Conceptual design study involved development of the conceptual design for the Caliente route option, environmental screening to aid in route siting, and a cost estimate for the conceptual route option. The results of the study were published in 1991 as a draft Conceptual Design Report on the Caliente Route (De Leuw Cather 1991).

Studies of the Carlin and Jean route options were intended to follow, as funding became available. However, conceptual design studies of the Carlin and Jean route options, which were to consist of the same scope of work, have not been undertaken as of this writing because the work has not been funded through the DOE budget process. Furthermore, funding for these studies has not been requested and therefore is not anticipated to be available during the federal fiscal year 1994 beginning October 1, 1993.

Despite the delay, DOE's intention to conduct conceptual design studies of the Carlin and Jean route options has not changed, according to DOE. Once funding is obtained, further conceptual design work will be performed. At that time the question will arise: Which of the remaining two route options will be studied first?

Limited funding became available in fiscal year 1990 to begin conceptual design work. At that point in time, the first task assigned to the subcontractor, De Leuw Cather, was to determine which of the three potential rail route options — Caliente, Carlin, and Jean — would be studied first. It was decided by the DOE to have De Leuw Cather begin with the Caliente route option first based upon the desire of the community leaders in the City of Caliente and Lincoln County (De Leuw Cather 1991, p. 1-3).

If funding is made available in the future to resume conceptual design work, but funding is provided at a level adequate only to proceed with the remaining studies one at a time, it has not been decided at this time which of the two remaining options would be studied first, according to DOE (Grassmeier 1993). The experience of the first round of conceptual design work, as reported by De Leuw Cather, indicates that the desires of community leaders — expressed to DOE and its contractors in a concerted and legitimate fashion — may influence the DOE's decision as to the priority for study of remaining route options.

Future Consideration of the Carlin Rail Route Option

The completion of the conceptual design study process for the Caliente, Carlin, and Jean route options will not conclude DOE's obligation to study the issue of rail-based transportation of waste to Yucca Mountain. Transportation issues, including modes and routes to be used, must be fully and openly addressed under the requirements of the National Environmental Policy Act (NEPA)

as they apply to DOE's pursuit in the future of approval to site and build a repository at Yucca Mountain. In a sense, the issue of what is a proper rail route to Yucca Mountain or, indeed, whether to provide rail access at all, is an issue which, to paraphrase a popular saying, may not reach closure until the issue is closed.

That said, it should be acknowledged that DOE's current intention is to include rail access for transportation of waste to Yucca Mountain in the potential repository-related transportation system within Nevada. There are many variables that will affect the final configuration of the transportation system. Some are geographic: the location of utilities where waste is currently stored, the location of prospective monitored retrievable storage (MRS) or interim storage (IS) sites, whether and when MRS and IS sites may be included in the system, containerization strategies, etc. In spite of many uncertainties, DOE remains committed to a rail transport alternative at this time (U.S. Department of Energy.).

The Preliminary Rail Access and Conceptual Design studies may not close the book on alternative route options. The initial ten potential route options (plus within-option alternatives) and the selection of three for further study represent the outcome of the Preliminary Rail Access Study. When conceptual design work is completed, the field may be narrowed to a preferred, more specifically aligned option that can be contrasted with feasible but less attractive alternatives. Even so, routes that have been screened out will continue to be monitored and, should conditions change, will remain available for re-evaluation, according to DOE (De Leuw Cather 1991, p. 1-1). Also, recommendations made by local communities have been and will continue to be included in route selection activities (De Leuw Cather 1991, p. 1-3).

The issue of transportation — rail access route options and other elements of the transportation system — will be included as a topic of public hearings that will be held during the preparation of an environmental impact statement (EIS) for the Yucca Mountain Project, if and when the site is determined to be suitable for a repository and DOE proceeds in its attempt to obtain the required license to build and operate one. Under NEPA, licensing of a repository at Yucca Mountain will have to be accompanied by preparation and submittal of an adequate EIS.

DOE's preferred and alternative route options defined during conceptual design will be presented for public consideration as part of the EIS "scoping" process, a period of public review and comment during which issues of concern to all parties with an interest in the Yucca Mountain Project must be identified, recorded, and evaluated for potential consideration in the EIS. To allow for adequate and informed consideration during scoping, the physical and operating characteristics of each alternative alignment, as well as associated potential impacts, must be presented. Then these characteristics and their potential impacts must be adequately assessed in the EIS.

Since an EIS must be completed and a license for the facility approved before work can begin on a repository at Yucca Mountain, no development activity would occur on the rail access facilities, which are part and parcel of the Yucca Mountain Project, until the EIS is complete and the license approved. However, construction of rail access facilities may be one of the first activities undertaken as part of the prospective repository construction program, since DOE anticipates that rail access to the site ought to be made available within two years of site approval in order to support site development activities (U.S. Department of Energy 1990, p. vii).

Issues Identification

DOE's planning efforts regarding the location and operations of a railroad to Yucca Mountain are still at a very preliminary stage. Much of DOE's effort is currently focused on the site characterization efforts for the Yucca Mountain repository itself. Consequently, DOE has not completed the conceptual design work on the Carlin and Jean routes or a thorough and comprehensive comparative evaluation to determine a preferred route. The delay offers Eureka County an opportunity to step up its own involvement in the rail access planning process and advance issues that may be appropriate to the stage of the study process or that, regardless of forum, represent local understanding and concern for the potential effects of a high-level nuclear waste railroad through Eureka County. This chapter identifies issues for Eureka County's use in this process.

Corridor Identification Issues

DOE's Preliminary Rail Access Study first reviewed existing and now-abandoned railroad routes. Several of these were included as route options, although the identified route options as configured for DOE's purposes deviated considerably from the historical railroad routes to avoid currently-developed or environmentally sensitive areas.

Second, in scanning the study area for other options, areas of obvious land use incompatibility were eliminated and areas of favorable topography were included. In the case of options identified by this process, the resulting terrain within the corridor is, according to DOE, often much more rugged than that of corridors developed or considered for a railroad in the past. Although they are feasible from an engineering viewpoint, routes over rugged terrain would generally require large amounts of earthwork and may result in a relatively higher level of environmental impact and operational difficulty. At this preliminary stage, the design standards used to assess engineering feasibility were a two percent desirable maximum and a 2.5 percent absolute maximum limiting grade and a maximum eight degrees (minimum 717 feet radius) limiting horizontal curvature. These standards are consistent with standard railroad engineering practices and DOE orders.

The potential rail route options so identified were further evaluated for land use compatibility, which was defined as the presence or absence of a land use conflict and the potential for abatement of any existing conflict. Land use conflict was identified in terms of existing and projected private development activities, as well as existing and potential Federal and/or State agency land-use designations.

Route options also were evaluated in terms of their access to regional carriers. Access to more than one regional carrier was preferred because of uncertainty surrounding the details of transportation operations for the rail shipment of waste to Yucca Mountain. Other criteria used in the evaluation included maximizing the use of federal lands and avoiding lands withdrawn from public use by federal actions. Given the location of Yucca Mountain relative to surrounding regional rail access points, the second of these criteria amounts to avoiding crossing the Nevada Test Site and Nellis Air Force Range, located in central Nye County.

The three routes that emerged from the process were characterized by DOE has having few potential land use conflicts and access to regional carriers. However, recommendation of the three routes for conceptual design is a preliminary decision and does not preclude the identification of additional viable routes or re-consideration of current options should new information become available that affects their potential feasibility, according to DOE (U.S. Department of Energy 1990, p. 3).

Conceptual Design Issues

If and when the Carlin route option undergoes conceptual design study, DOE and its technical contractor probably will use the same approach taken in studying the Caliente route option during fiscal year 1990. The scope of the Caliente study was to develop the conceptual design, provide a preliminary environmental analysis, and prepare a cost estimate, using a set of design criteria also developed at the outset of the study. The process would involve communities, according to DOE. This means meetings with local officials along the potential route to get their initial input to the route selection process. It also means including the recommendations made by local communities in route selection activities (De Leuw Cather 1991, p. 103), something that occurred during consideration of the Caliente route option.

In contrast to corridor selection, cost was a direct consideration in conceptual design. Enough engineering design was conducted to make an estimate of construction cost of the numerous within-corridor alternatives. The recommended within-corridor alignment was selected to minimize construction costs, avoid operational problems, and avoid interference with environmentally sensitive areas, archaeological sites, private property, and the Nevada Test Site and Nellis Air Force Range. Since construction costs generally increase with length of track and the amounts of excavation and embankment required, and operational difficulties generally increase with increasing grade, vertical curvature, and horizontal curvature, the criteria place a premium on finding a straighter route through more gentle terrain, without violating environmental and other land use constraints.

Construction and operating scenarios were hypothesized in order to estimate costs. A range of estimated construction costs was calculated, depending on construction assumptions and signalling options. A range of operating cost estimates also were calculated, depending on the ownership and operating structure. Although it has cost and other implications, a "shared use" version of the route was not investigated in the conceptual design report. Shared-use refers to allowing public use of the rail route. The alternative, "restricted use," means the rail route would be used for nuclear waste shipments only.

The following sections describe issues considered within the various stages of DOE's conceptual design study process.

Alignment Definition

During conceptual design, the focus is on developing alternative route alignments within an identified corridor. Alignments are built up from specific route segments. Route segments, in turn, are identified within a study area based on the stated engineering requirement of not exceeding a

2.5 percent grade and an 8.0 degree maximum curvature (minimum curve radius of about 720 feet), plus broad land use/environmental restrictions. Potentially usable segments are those traversing an area without encountering a mountain range and mountain passes allowing a line with a 2.5 percent or lower grade to be drawn in both directions. National forest lands are avoided during this process because national forests are typically on land too steep for railroad construction, as shown on USGS maps, and railroad right-of- way would likely be a controversial land use within a national forest.

Segment identification results in a "spider web" of segments within the corridor. Engineering statistics are compiled for each segment: length, rise/fall, and number of bridges (stream crossings). Segments are then linked together into possible routes. Figure 3 summarizes the engineering feasibility attributes used to characterize alignment alternatives identified by this process.

Figure 3 -- Engineering Feasibility Attributes of Potential Route Segment, Alternative Alignments Definition Stage of Conceptual Design Study, DOE Yucca Mountain Rail Access Study Process

Limiting Conditions	Summary Attributes
Maximum grade: 2.5% Maximum curvature: 8.0 degrees	Length (in miles) Cost (in million \$) Average Grade (in %)* Grades of more than 5 miles in length and 1.8% grade (number): Curves by Degree (number): 0 - 2 45' 3 - 3 45' 4 - 8 45'

*Total rise and fall divided by route length.
 Source: De Leuw Cather, p. 2-3, 29.

At this stage, the analysis relies on 1:250,000 scale contour maps. Because of the numerous possible combinations of segments, and the preliminary nature of the map-based information available on them, the route segments are screened for potential land use, environmental, biological, and geotechnical constraints. Segments that are feasible from an engineering point of view are overlaid with maps of potentially restricted areas. Restricted areas are graded in terms of their potential to deny access to a particular right-of-way. Potential alignments are defined by choosing segments that minimize conflict with restricted areas or, where conflict is unavoidable, intrude on areas of mildest restriction. The screening process is used as a guide to further route

eliminate alignment alternatives at this stage of conceptual design.

Figure 4 -- Land Use, Environmental, Biological, and Geotechnical Restrictions Used to Screen Potential Alignment Segments, Alternative Alignment Definition Stage of Conceptual Design Study, DOE Yucca Mountain Rail Access Study Process

Restriction Level	Definition	Presenting Conditions
Level 1	<p style="text-align: center;">NO RESTRICTION</p> <p>Presence of conditions would not restrict right-of-way access</p>	<p>Generic BLM Lands Class IV VRM Areas Unprotected Species Geotechnical Features</p>
Level 2	<p style="text-align: center;">MILD RESTRICTION</p> <p>Presence of conditions would impose extra cost or require mitigation to allow a railroad right-of-way</p>	<p>Class III VRM Areas Private/Patented Lands Wild Horse/Burro Ranges Big Game Management Areas State Protected Species/ Federal Candidate Species (Bighorn Sheep, Canadian Elk, Gila Monster)</p>
Level 3	<p style="text-align: center;">SIGNIFICANT RESTRICTION</p> <p>Presence of conditions would impose a higher level of restriction on a railroad right-of-way that might be allowed only if no other feasible alternative were available</p>	<p>Class II VRM Areas National Forests American Indian Reservations Reservoirs & Water Reserves State/County Lands Endangered Species Per Federal Act (Pahranagat Valley Vole, Armagosa Toad)</p>
Level 4	<p style="text-align: center;">SEVERE RESTRICTION/INCOMPATIBLE USE</p> <p>Conditions which would prohibit or, through controversy, effectively prohibit a railroad</p>	<p>Wilderness Study Areas Class I VRM Areas Areas of Critical</p>

	right-of-way	Environmental Concern (ACEC) National Parks/Monuments National Wildlife Refuges BLM Protective Withdrawal Lands Wildely-Recognized Endangered Species (Desert Tortise, Bald Eagle Peregrine Falcon) Military Facilities/Reservations
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BLM U.S. Department of the Interior, Bureau of Land Management
VRM Visual Resources Management
Source: De Lew Cather 1991, p. 2-4, 22.

Engineering Analysis

After defining potential alignments, DOE conducts a basic engineering analysis to develop the information needed to choose a within-corridor alignment. Engineering analysis leads to the identification of an alignment "concept," a proposed alignment with enough hypothetical detail to allow development of useful cost estimates. A concept consists of a layout (plan and profile of the trackage), plus the identification of geotechnical constraints, drainage and structural requirements, signals and communications facilities, and other fixed facilities required for the construction and operation of a railroad.

At this stage, work is done on more detailed maps (1:24,000 scale 7.5 minute USGS quads), with field reconnaissance trips taken to inspect the alignments. Land use and environmental data also are developed from published or other secondary sources at the 1:24,000 scale and are used interactively to develop and modify the route segments. Cultural resource information for a one-mile wide corridor around route segments is assembled from existing literature and from major regional archival repositories. Field trips are taken by civil, geotechnical, and drainage engineers. Additional field inspection is conducted by planners evaluating impacts of the routes on cultural and natural resources.

Cost

The length of the railroad is the most important factor in determining costs of constructing and operating a railroad. Length generally translates into construction, or capital, costs through the

accumulation of design, engineering, and construction effort. Length generally translates into operation and maintenance (O&M) costs through the time on the job of personnel and costs of track and stock maintenance.

Besides design, engineering, and construction, capital costs also include the initial expenditures to buy rolling stock and other durable equipment. At the conceptual design stage, capital cost estimates depend on numerous assumptions: How much earthwork? How many bridges? What type of ties? What types of signals? How much and what kind of rolling stock, maintenance equipment, building facilities, and emergency equipment? O&M costs cover the operation and upkeep of the railroad. Key items are personnel, maintenance of way, and maintenance of rolling stock.

Estimated costs for the Carlin rail route option developed in the Preliminary Rail Access Study were \$659 to \$661 million in capital costs and \$2.5 to \$2.9 million in annual O&M costs in 1988 dollars. Restated in 1990 dollars, the amounts are equivalent to \$759 to \$761 million in capital costs and \$2.9 to \$3.3 million in annual O&M costs. Note that comparable estimated costs for the Caliente rail route option presented in the Conceptual Design Report were \$1.0 to \$1.3 billion in capital costs and \$4.4 to \$6.9 million in annual O&M costs in 1990 dollars. Since the two route options are similar in length, the difference in costs is probably due to the more specific estimating methodology used at the conceptual design stage.

National Environmental Policy Act (NEPA) Issues

The site characterization program now underway at Yucca Mountain is meant to determine whether the site is suitable for a high-level nuclear waste repository. Should the site be found suitable, DOE will be required under the National Environmental Policy Act (NEPA) to support its decision to select Yucca Mountain for a repository by preparing an environmental impact statement (EIS).

According to DOE, the issue of transportation — including the selection of a preferred rail access alignment concept — will be given a full and open treatment in that EIS, along with the rest of the proposed repository project (De Leuw Cather 1991). The EIS process is defined in the statute, regulations of the Council on Environmental Quality (CEQ), and federal agency procedures, in this case the procedures of DOE. The process includes considerable flexibility and opportunity for outside intervention.

Because final decisions have not yet been made, DOE may be influenced in a number of ways: to address other alternatives, to address additional issues, or to address issues in a particular way. To influence EIS preparation, Eureka County should plan to conduct its own analysis of the proposed action. Then the results may be communicated through direct consultation with DOE, in public meetings, and through "scoping." This report, in effect, is a first step in just that sort of analysis.

The regulations governing EIS preparation define scoping as the means for determining the issues to be addressed and for identifying the significant issues related to a proposed action. The scope consists of the range of actions, alternatives, and impacts to be considered in the EIS. The purpose of scoping is to endeavor to reach agreement among all interested parties on the issues that should

be addressed in the EIS. Because of its statutory standing as a potentially affected unit of local government, Eureka County is assured of a role in the scoping process.

Although any reasonable issue may be advanced for consideration by an EIS, NEPA and the regulations identify the range of effects that should at least be reviewed for their potential impact as the EIS process unfolds. Effects include ecological (such as effects on natural resources and ecosystems), aesthetic, historic, cultural, economic, social, and health. Figure 5 is a listing of eight categories of biophysical and socioeconomic attributes covering the human environment at a generalized level.

Figure 5 -- Categories of Generalized Environmental Attributes

Air	Sound
Water	Human Aspects
Land	Economics
Ecology	Resources

Source: Jain et al. 1993

The above describes elements which may be considered, and would be considered if concern surfaces during the scoping process. However, certain potential impact topics are subject to requirements specified in statute, regulation, or executive order and must be considered in all EIS's if the features are present in the environment. They are listed along with the relevant authority in Figure 6.

Figure 6 -- Critical Elements of the Human Environment

Element	Relevant Authority
Air Quality	The Clean Air Act as amended (42 USC 7401 et seq.)
Areas of Critical Environmental Concern (ACEC)	Federal Land Policy and Management Act of 1976 (43 USC 1701 et seq.)
Cultural Resources	National Historic Preservation Act as amended (16 USC 470)
Farm Lands (prime or unique)	Surface Mining Control and Reclamation Act of 1977 (30 USC 1201 et seq.)

Floodplains	E.O. 11988, as amended, Floodplain Management
Native American Religious Concerns	American Indian Religious Freedom Act of 1973 as amended (42 USC 1996)
Threatened or Endangered Species	Endangered Species Act of 1973 as amended (16 USC 1531)
Wastes, Hazardous/Solid	Resource Conservation and Recovery Act of 1976 (42 USC 6901 et seq.) Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended (42 USC 9615)
Water Quality, Drinking/Ground	Safe Drinking Water Act as amended (42 USC 300f et seq.) Clean Water Act of 1977 (33 USC 1251 et seq.)
Wetlands/Riparian Zones	E.O. 11990, Protection of Wetlands
Wild and Scenic Rivers	Wild and Scenic Rivers Act as amended (16 USC 1271)
Wilderness	Federal Land Policy and Management Act of 1976 (43 USC 1701 et seq.) Wilderness Act of 1964 (916 USC 1131 et seq.)

Source: U.S. Department of the Interior 1988.

Issues of Particular Local Concern

In addition to the environmental and design issues described above, Eureka County will have many particular concerns about the alignment and operation of a nuclear waste transportation

route bisecting the county. This section introduces a discussion of some of the major issues of concern to the county and its residents. These issues include both fundamental concerns about the design and implementation of the national waste management program and the Yucca Mountain project, as well as specific concerns about the physical and socioeconomic conditions along the Carlin route. These issues point to potential direct and indirect effects of specific alignment alternatives that would have a long-term impact and may alter patterns of activity deeply woven into the social and economic fabric of Eureka County.

General Concerns

Eureka County's Relationship with DOE. Among the basic concerns about the OCRWM program and the Yucca Mountain project will be the evolution and outcomes of the relationship between Eureka County and the U.S. Department of Energy. Although it is not possible to describe in detail the precise relationship or define the specific issues that will arise over the course of DOE's transportation planning, it is important for the county to understand at each step in the process of project development the exact nature of the decision process, and the implications to Eureka County. For example, it is important for the county to distinguish between any communications by DOE's contractors and official DOE policy or enforceable DOE commitments. This distinction will become increasingly important as decisions are made concerning specific rail alignment, ownership of the route, operation and maintenance of the line, and liability for all types of risks (radioactive and other) associated with the transportation of nuclear wastes and other materials on the route.

Overall Effect of the Route on Eureka County. The specific discussions of environmental, socioeconomic and design issues related to the Carlin route often might cloud a more basic, but less definable impact on the county. The existence of a highly visible and secured rail line bisecting Eureka County, carrying extremely noxious material, and potentially a target for protest or sabotage will have many unforeseeable but potentially severe impacts on the county and its citizens. For example, in addition to the specific costs and benefits to economic activity and land use in the county (which are described below), there is a possibility that the route will change the fabric of Eureka County in ways that cannot be specifically predicted with confidence. The possibility of such fundamental effects should be considered by the county in connection with any discussion of the specific effects, such as those described below.

One example of a potentially fundamental effect is on agriculture. Agriculture is not just Eureka County's second largest industry. It also is an embodiment of a tradition and valued way of life. As a result, Eureka County is firm in its commitment to the protection and encouragement of agriculture and its associated lifestyle. Therefore, the potential to disturb this aspect of life in parts of Eureka County should be considered as a primary issue in any study of the Carlin route.

Construction and Operation of the Railroad

Rail access development would have direct effects on the local economy, largely associated with the construction phase of the railroad project. These effects (temporary local hiring and local purchasing and fiscal, facility, and service demands due to temporary populations) also should be anticipated and considered by Eureka County as part of its input to DOE on the rail access

development program. However, the duration of these impacts should be relatively short, although some may endure beyond the construction phase. Consequently, their potential for a lasting impact on Eureka County should be limited.

Construction and operation of a railroad on the Carlin route would have direct economic effects in Eureka County during construction (short term) and operations (long term). Rail line construction generally progresses along the corridor, affecting different communities as it proceeds. The communities serve as staging points for crews and some support functions for job sites long the corridor. As it proceeds, construction generates incomes for local hires, local businesses selling to and local contractors engaged by the project, and local businesses selling to project employees.

In Eureka County, rail construction may be seasonal. During operations, the number of local jobs generated and volume of spending at local businesses typically drops, but the effects are long-term and year-round.

Other economic effects of development of the Carlin rail route option may be related to economic development potentials.

Environmental Issues

Water. Land in Eureka County south of the Humboldt River lies in the Central Nevada Basin and Range physiographic area, as defined by the U.S. Department of Agriculture Soil Conservation Services. Water is scarce in the region, and available surface and ground water is used for irrigation. With the exception of the Humboldt River, streams are generally small and intermittent and depend on sources in the higher mountains. Groundwater is available in valley fills, but it has been or is increasingly utilized for crop irrigation or, where other factors permit, residential or other development. A few small reservoirs in southern Eureka County are used for irrigation or recreation.

Floodplains. Floodplains along the course of the Humboldt River in Eureka County are a significant environmental area. Depending on its precise alignment, the Carlin route would pass through or next to many miles designated as Zone A (100-year floodplain, without base flood elevations or flood hazard factors determined) by the Federal Emergency Management Agency (FEMA 1990). Most of these areas are adjacent to the Humboldt River (where the UP/SP paired trackage travels through Zone A along its entire length through Eureka County), and adjacent to Pine Creek, Denay Creek and their tributaries. Recognizing the special characteristics of floodplains, including constraints on land use and other development, the 1973 Eureka County General Plan recommended reserving the Humboldt River floodplain as permanent open space available for agricultural or recreational pursuits.

Wetlands. Concerns over wetlands focus on the plant and animal communities supported within them. The loss of wetland areas also may impact the quality and quantity of surface and ground water. The jurisdictional interest in wetlands is spread among four federal agencies. Each defines a wetland in terms of water, vegetation, and soil characteristics, but the definitions differ. Therefore, information identifying wetlands may be inadequate or conflicting. Nevertheless, wetlands are subject to protection (as defined by each agency) from impacts of construction or

other development-related activities.

Wildlife. Eureka County supports many different species of wildlife. Many common species are found throughout the entire county, and some species are limited to certain areas by physical characteristics such as availability of water, temperature, and humidity. Figure 7 presents the most common species found in the Eureka County. The most commonly hunted species in Eureka County are mule deer, antelope, sage grouse, and rabbits. The deer, grouse and rabbit hunts attract hunters from outside the county and state. Two species commonly found in the county have protected status: the bald eagle (endangered) and the lahontan cutthroat trout (threatened). Any assessment of corridors and alignments would have to take into account effects on Eureka County wildlife, including hunted and protected species.

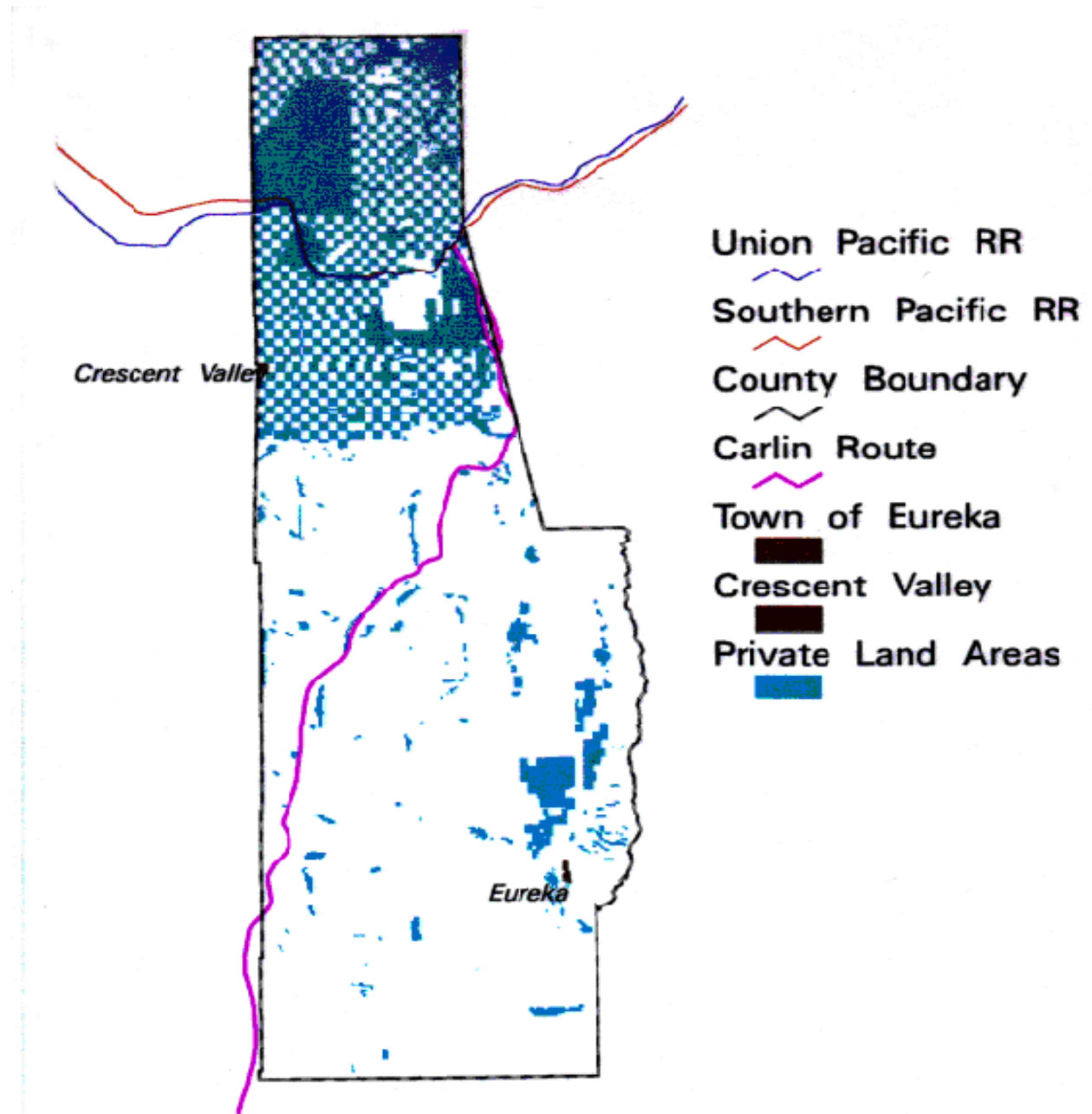
Figure 7 -- Common Wildlife Species in Eureka County

Category	Species
Big Game	Mule Deer, Antelope, Mountain Lion
Upland Game	Quail, Cottontail, Pigeon, Sage Grouse, Dove, Chukar
Waterfowl	Duck, Merganser, Coot, Snipe, Geese
Non-Game	Wild Horse, Great Basin Snakes, Bald Eagles, Other Birds (131 common species)
Aquatic	Warm Water: Black Bass, Northern Pike Cold Water: Rainbow, Brook, Brown, and Cutthroat Trout

Economic Effects

Crop Production. The potential effects on the land use and economy of Eureka County are among the most critical of the local concerns about the Carlin route. The preliminary alignment of the route, particularly in the Pine Valley segment between Palisade and the Denay Valley, could substantially disrupt existing farming and ranching activities. [Figure 8](#) shows the areas of land in

Figure 8 - Private Land Areas in Eureka County



Eureka County, with the Carlin route superimposed, together with the approximate location of ranches along the route. As shown, the greatest concentration of patented land is in the north half of the valley, where railroad patents account for significant areas of private land in the "checkerboard" pattern surrounding the Union Pacific and Southern Pacific railroads. On the Carlin route for several miles south of the Humboldt River, most private land is devoted to hay and other crop production in a number of ranches along SH 278. The route could interfere significantly with agricultural production in this area, separating ranch buildings from fields.

A potential offsetting benefit to ranching operations could be the use of rail lines to receive materials into and ship products from the area. However, this benefit is likely to be minimal, given the primarily local use of agricultural products and the low ratios of value to volume and value to weight (and correspondingly high proportion of transportation cost to price) of those products.

Grazing. In addition to crop production, the route would substantially disrupt grazing patterns along its entire length. [Figure 9](#) shows the location of grazing allotment areas along the Carlin route. In the northern part of the route (in the area administered by the Elko District office of the BLM), grazing allotments are exclusive to each permittee, with a sub-allotment defining the grazing extent; in the south (covered by the Battle Mountain BLM District), allotments are shared among permittees within each allotment area. The effect of bisecting allotment areas, particularly in the northern segment of the route, would interfere significantly with historic and efficient grazing practices.

An offsetting benefit could include providing local ranchers with less expensive transportation of materials and products. Compared with crop production, the value of beef is higher per pound, and therefore shipment of beef products by rail might constitute a substantial benefit to the county's ranchers. [Figure 10](#) shows the location of ranches in the vicinity of the Carlin route.

Mining. As the largest contributor to economic activity in the county, mining impacts will be a particular concern in studying the effects of the Carlin route option. The active mines near the corridor include the Atlas Gold Bar Mine which employs about 200 persons, the Cortez Horse Canyon Mine which employs about 100 persons, and the Nevada Barth Iron Mine and Mill which employs 2 persons (Nevada Department of Industrial Relations 1993). In addition to active operations, there are numerous patented mining claims surrounding the route. For example, the Tonkin Springs Project — located just west of Tonkin Springs — recently closed. The Eureka County Clerk shows a total of about 25 patented mining claims in the vicinity of the Carlin route (Planning Information Corporation 1993).

The impact of the route on mining activities could include interference with flow of activities at the mine sites, as well as the potential discouragement of development of properties close to the route. One issue that should be addressed by the DOE are the relative legal positions of the patent owners' subsurface mineral rights vis a vis the right-of-way surface rights, particularly if mine development increases after construction of a rail route.

Figure 9 Potential Affected Grazing Areas in Eureka County

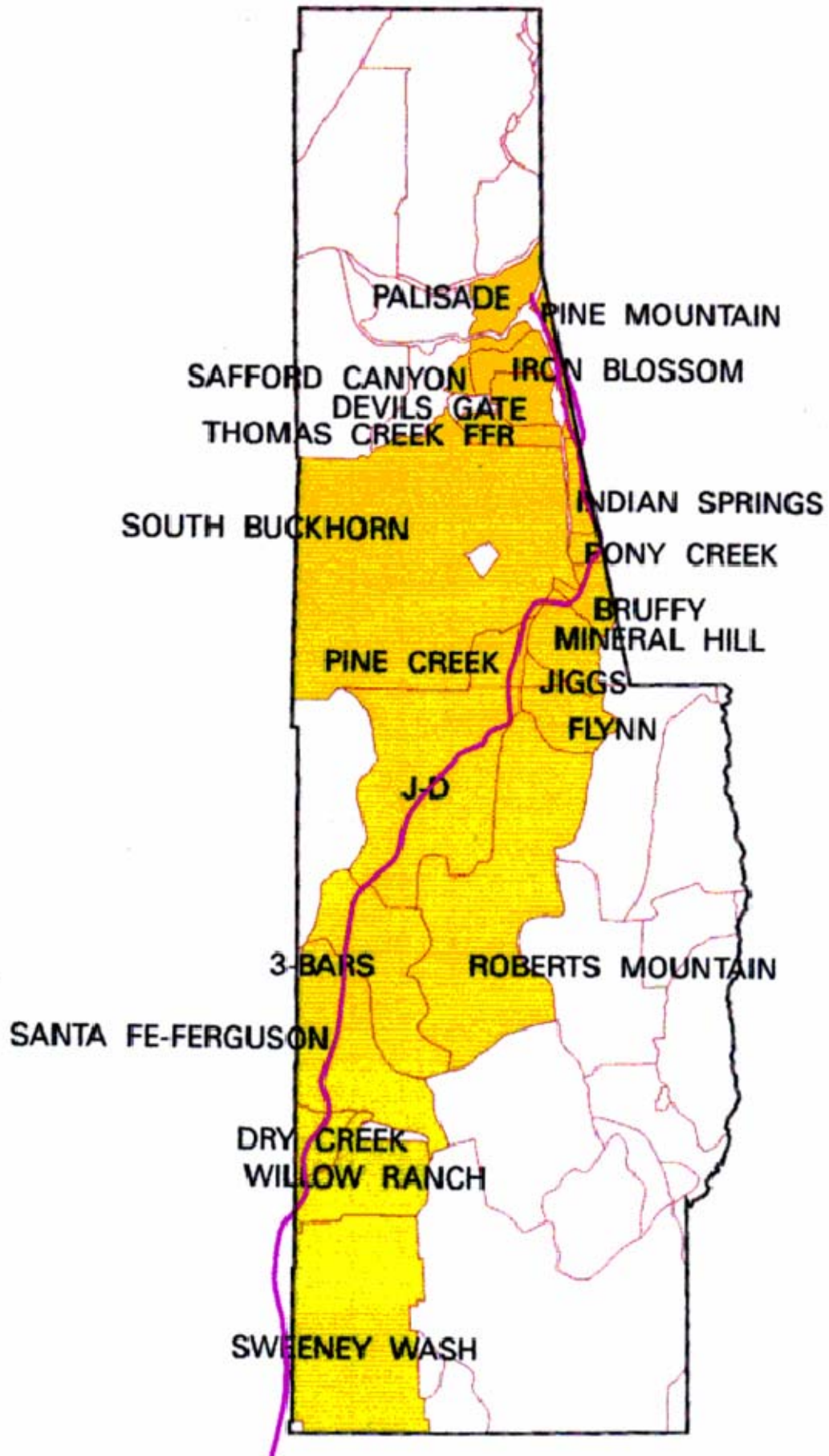
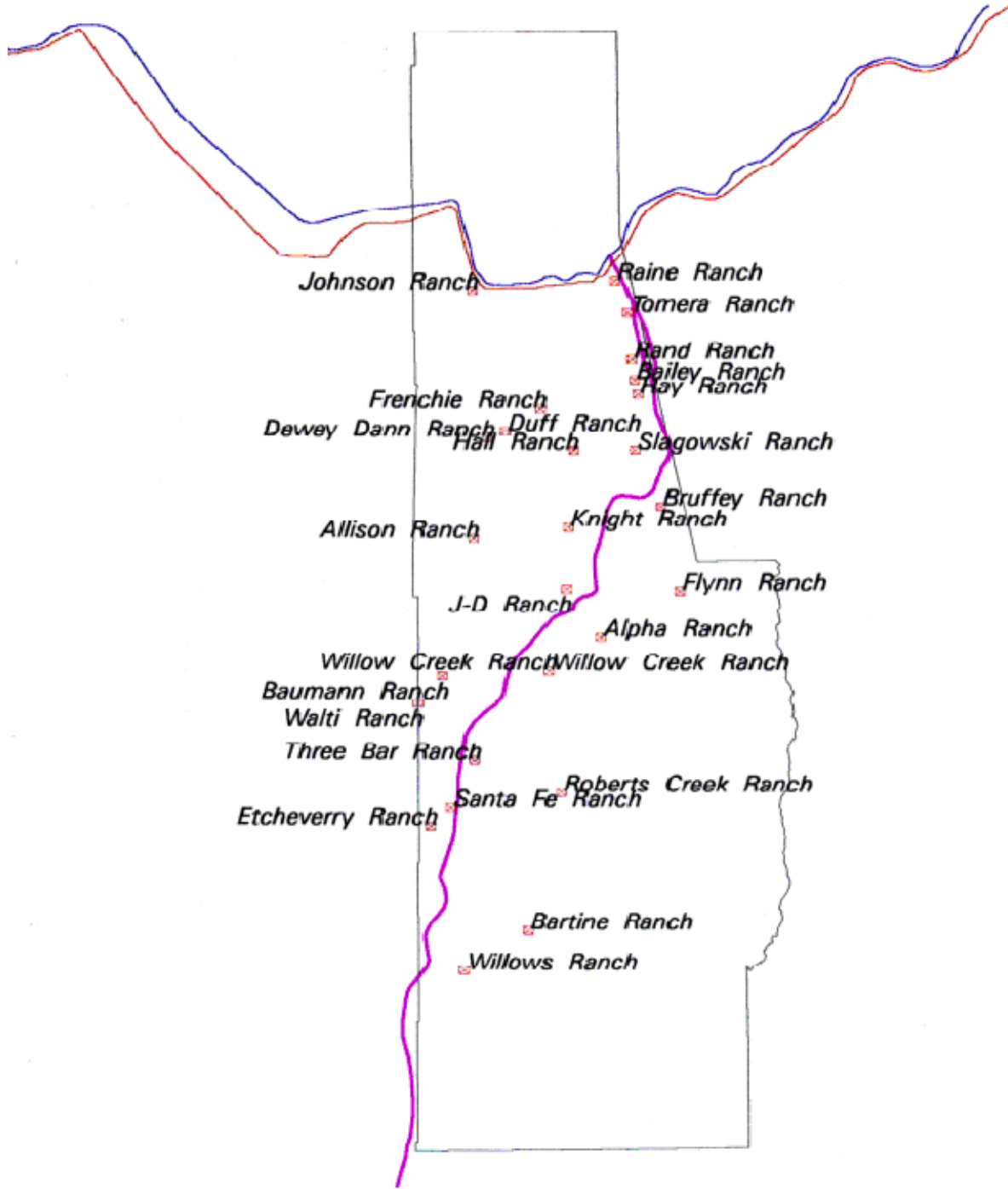


Figure 10 - Ranches in the Vicinity of the Carlin Route



Conclusions

DOE's Yucca Mountain rail access planning process has been subject to under-funding, uncertainty, and delay. Therefore, Eureka County, should it desire to do so, has the opportunity to gear up its involvement in the rail access planning process. The following sections summarize the findings of this report in terms of opportunities for Eureka County involvement in the study of the Carlin route option and potential issues for investigation. Finally, there is a brief discussion on how Eureka County can position itself for a higher level of involvement in DOE's rail access planning process.

Findings

Among the important findings of this investigation are:

1. DOE's Preliminary Rail Access Study identified ten basic route options, or corridors, and recommended that three of them, including the Carlin route option, be given further study at the Conceptual Design level. However, DOE has not ruled out consideration of new corridors not included in the Preliminary Rail Access Study process. In fact, one of the ten options considered included significant corridor modifications suggested by Lincoln County and the City of Caliente, not DOE. Therefore, if it so wishes, Eureka County may propose alternative corridors to DOE.
2. To date, only the Caliente route option of the three route options recommended for Conceptual Design has undergone Conceptual Design. DOE has not requested funding for additional Conceptual Design work in fiscal year 1994, and funding for Conceptual Design work in the future is uncertain. If funding is made available in the future for more Conceptual Design work, and the funding is inadequate to study both of the pending route options (Carlin and Jean), it has not been decided which of the route options will be studied first. Therefore, Eureka County has the opportunity to advocate, should it wish to do so, an order of priority for the remaining two Conceptual Design studies.
3. The Conceptual Design study process defines specific route alignment options within a corridor and selects a preferred alignment based on engineering constraints, preliminary land use and environmental screening, and preliminary operating and maintenance costs. In central Nevada, route options tend to follow the floors of north-south trending valleys when possible and to use the gentlest passes from basin to basin when necessary. Therefore, considering topography alone, there are many route alignment options within a given corridor in all but the most constricted portions of the corridor. Other constraints — engineering costs, federally withdrawn lands, land use incompatibilities, private land uses, environmental sensitivities — which are used to narrow the options, represent public policies and expert value judgments and are not necessarily immutable criteria. In fact, they generally are subject to debate, re-evaluation, negotiation, mitigation, etc. Therefore, Eureka County has the opportunity to advocate its own alignments, even its own structures for evaluation of alignments, during the Conceptual Design stage of the process.
4. At all stages, the DOE study process solicits public involvement but generally relies on consultant expertise. As a result, evaluations and decisions on rail access alternatives may

appear to have been made away from the public eye to all but the most actively involved persons, organizations, and government agencies. Nevertheless, DOE is clearly on the record that local involvement is solicited — even statutorily assured for potentially affected units of local government — so there is considerable latitude for Eureka County input to identify issues of concern, frame them for consideration in the planning process, and have them considered. The opportunity for input may occur at already specified points in the process (e.g., EIS scoping). Or it may be created through an alternative process for interaction established directly by agreement and experience between Eureka County and DOE.

Alternative Alignments

In addition to the issues surrounding the currently-described Carlin corridor, individuals in Eureka County have expressed a desire to recommend alternative alignments for the Carlin corridor, generally avoiding the Pine Valley impacts described in this report. A cursory inspection of the elevations and grades surrounding the Humboldt River between Carlin and Battle Mountain suggests three possible points of departure: the Pine Valley connection described in the Preliminary Rail Access Study; a connection into the Crescent Valley near Beowawe; and a connection into the Reese River Valley near Battle Mountain.

Although it is important that Eureka County and its residents express their desire for DOE to consider alternatives to the present Carlin alignment, it is equally important that the county not be in a position to advocate an alternative alignment. It is sufficient to describe the disadvantages of the current alignment from the county's perspective, and to suggest that these disadvantages would be avoided or minimized by one of the other potential alignments. It is beyond the county's responsibility to attempt to answer all potential concerns (engineering, environmental, and other) regarding any alternative — this is clearly the responsibility of the proponent of the nuclear waste repository and its access routes. If the county proposed a specific alternative, it could be in the position of having to support that alternative, through expensive engineering and environmental studies. Also, the county might incur opposition from its residents and from neighboring jurisdictions, raising the potential for additional costs of litigation and political processes.

Therefore, we recommend to the county that it prepare information concerning the Carlin route as currently proposed, and consider its interests vis a vis that alignment. This does not, however, preclude a description of potential impacts on the Carlin route relative to other parts of the county. For example, the county could consider comparing effects on specific conditions (e.g., value of croplands) along the Carlin route with effects in other parts of Eureka County.

Involvement in the DOE Rail Access Planning Process

For the county to determine its interests in the proposed Carlin alignment, and to communicate county policy to DOE, it is important to establish a mechanism in the county to consider these issues. This mechanism could include a procedure for studying specific route alignment issues, a means of discussing alternatives and their effects on local inhabitants, a means of communicating information to the Eureka County Board of Commissioners, and one or more points of contact with DOE, the State of Nevada, and other parties interested in Yucca Mountain transportation

planning.

One example of such a mechanism could include establishment of a Eureka County nuclear waste transportation route policy group that would report to the Board of Commissioners. This group could include both technical and policy members whose primary responsibilities would be to collect information about any proposed rail alignment, to develop data on community conditions, to present route and other information to the public, to receive comments and recommendations from the public, and then to formulate policy options for consideration by the County Commissioners.

The policy group could also maintain regular contact with the Department of Energy to understand current developments surrounding the Yucca Mountain project generally, and the transportation planning activities specifically. It is important to maintain contact with DOE both at the Yucca Mountain project level and at the national OCRWM program level to ensure that information is current and reliable and to ensure that the county's interests are understood at appropriate levels.

The specific design of the policy group and its procedures should be discussed among Eureka County's Yucca Mountain Office staff, other key staff whose responsibilities include some aspect of repository-related planning, and the Board of Commissioners. Some considerations in designing the procedure include the appropriate mix of technical and policy representatives, the lines of communication and authority between the County Commissioners and the staff, and the appropriate degree of involvement of third parties in the process. Given the lead time available due to DOE's inactivity in detailed transportation planning, these issues can (and probably should) be worked out in process.

We recommend that the Commissioners consider the appointment of a core study group, perhaps comprising the Director of Public Works, the Chairman of the County Board of Commissioners, and the Yucca Mountain Office coordinator. This group could develop initial procedures and schedules for providing public presentations of information collected to date about the Carlin route and the socioeconomic and other data collected by the Office and develop a preliminary agenda for discussion of issues related to the route and its impact on Eureka County.

As DOE plans are discussed, and as alternatives are considered, the Eureka County Board of Commissioners could use such a group to maintain effective and efficient contact both with DOE and with interested observers and participants. At each milestone event, or as other circumstances warrant, the structure and mission of the group could be modified as appropriate, but the group's existence would provide a reliable point of contact for considering nuclear waste transportation issues.

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