

2.0 Methodology

2.1 IDENTIFICATION OF POTENTIAL ALTERNATE ROUTES

A literature review of previous DOE-commissioned studies and extensive field analysis were conducted to determine potential alternate routes. Two alternate routes were recommended to the Lincoln County Commission and selected for detailed analysis early in the process at a public meeting. Below is a brief summary of the previous studies reviewed:

2.1.1 1990 – Preliminary Rail Access Study (Tappen et al, 1990)

This study identified 11 different routes within Nevada between existing rail lines and Yucca Mountain including 3 alternative routes posed by Lincoln County. It concluded that Caliente was one of three (also including Jean and Carlin) preferred alternatives to be further evaluated. The Caliente “base” option was found to be the most favorable, but would incur significant costs due to “complex engineering and construction required to traverse through rough terrain”. This route began “on Union Pacific Railroad (UP) mainline 4 miles east of Caliente crossing US 93 on a long trestle at Indian Cove” proceeding to US 93 and paralleling it and SR 375 to US 6. The options proposed by Lincoln County included:

- Route A which was similar to what DOE is currently proposing, but after going through Water Gap it then turned south into the Nellis Air Force Range near Chalk Mountain.
- Route B was very similar to the “Crestline Alternative” that has been potentially pulled from consideration, and then followed Route A from Panaca on.
- Route C departed the UP mainline near Elgin, following Kane Springs Valley and Coyote Springs Valley to U.S. Highway 93 and into the Desert National Wildlife Refuge.

The report stated that all of these options were discounted due to land-use conflicts, but would “continue to be monitored for changes in their status that could affect their potential feasibility”.

2.1.2 1992 – Yucca Mountain Rail Access Study: Caliente Route Conceptual Design Report (DeLeuw, Cather and Company, 1992)

Two routes were “conceptually designed” using USGS quad maps. These two routes were selected based on engineering criteria (max 2.5% slope), flood considerations, geological considerations, and preliminary environmental impacts. Option A is the route that the Lincoln County Short Route was based upon with only a slight modification near Hancock Summit. The only other difference is that Option A paralleled SR 375 northwest through Rachel in order to bypass the Nellis Air Force Range. Option B presented in the report is similar to what DOE currently presents as the Caliente Corridor.

2.1.3 1995 - Nevada Potential Repository Preliminary Transportation Strategy – Study 1 (TRW Environmental Safety Systems, Inc., 1995)

This report cites the 1990 report regularly. It says several times that "...although feasible from an engineering viewpoint, routes through rugged terrain would be exposed to a higher level of environmental and operational hazards than routes with comparatively gentler terrain" (page 25). It again reiterates that Routes A and B posed by Lincoln County in 1990 could be added to the list of feasible alternatives if there was a "...change of status of those areas within the DOD Nellis Air Force Range" (Pg 26). Later in the report it states that, "Verbal input from DOE has indicated that the land use status has not changed in the last five years" (Pg 99). It states that the Caliente route has been conceptually designed. Option A traverses much more rugged terrain, and requires a tunnel at one point, while Option B traverses much gentler terrain. The report then says, "This discussion will focus on the Option B route as the preferred option" (Pg 35).

2.1.4 1996 – Nevada Potential Repository Preliminary Transportation Strategy – Study 2 (TRW Environmental Safety Systems, Inc., 1996)

The executive summary of this report states the purpose as further study of the four rail routes, including Caliente Option B only, identified by Study 1 including archaeological and historical sites. It also discusses a reduction in the cost estimate due to reduced engineering cost projections. This report only discusses that portion of rail from Mud Lake west. The balance of the route, "from Mud Lake to the UP connection at Caliente has been left for subsequent studies because of the remote nature of this portion of route" (Pg 2-15). The report begins to set much more stringent engineering standards. "A maximum grade of 1.5% is desired in order to provide a level of operating safety consistent with adjacent rail lines. In areas where 1.5% grades are not feasible, a maximum grade of 2.2% may be used." The report goes on to say that "it is generally recognized by the industry that operating difficulties increase significantly as grades increase above about 1.5%" citing a 1973 study (Pg 3-3).

Page 3-8 also acknowledges that an alternate route was proposed in the 1992 study that closely paralleled US 95 and SR 375. It says "This route required either extensive earthwork or a 2.5 – 3-mile tunnel to cross Hancock Summit near State Route 375, and was estimated to cost about 30 percent more than the more northern alignment. Because of the significantly higher cost with little benefit, the alternative alignment is not included in Study 2 and will not be considered in future studies unless it becomes necessary when more detailed studies are performed on the Caliente base route" (page 3-9). Two key items should be noted. The 1992 report only studies preliminary environmental issues, and did not discuss other impacts such as private property or land-use conflicts. The conclusion also states "...no significant population issues to the potential rail corridors were identified in any of the counties studied" (Pg 11-2).

2.2 PUBLIC LANDS GRAZING ANALYSIS

The RCI Project Team analyzed public lands grazing impacts and associated mitigation actions for the following: DOE Proposed Corridor and Alternatives, Lincoln County Cottontail Pass Alternative, and Lincoln County Short Route. The primary means of identifying impacts and mitigation actions was to interview grazing allotment permittees.

In order to conduct field interviews, Resource Concepts, Inc. (RCI) identified the permittees directly impacted by the rail corridor and alternatives listed above. An effort was made to identify additional allotments, not directly in the path of the rail corridors, which would be impacted due to associated construction and operations activities. However, requests to DOE for pertinent information were not filled, and analysis was already complete when the *Draft Environmental*

Impact Statement for a Rail Alignment for the Construction and Operation of a Railroad in Nevada to a Geologic Repository at Yucca Mountain, Nye County, Nevada (DEIS-RA) was released. Grazing permits and range improvements were requested and gathered from the pertinent Bureau of Land Management (BLM) offices ahead of interviews with permittees.

The DOE Proposed Corridor and Alternatives was analyzed by RCI in a May, 2005 report titled "Proposed Yucca Mountain Corridor." It should be noted that for the most part the same protocol and assumptions were used to develop the 2005 and 2007 reports. The permittees were sent copies of the 2005 impact analysis for their allotment(s) and asked if the findings were still valid. They were asked to inform RCI if the analyses needed updating or changes to accurately reflect their current view of the impacts and mitigation. In addition they were offered the chance for a personal interview if that would help them convey their views. New allotment specific analyses were prepared from these contacts.

The Lincoln County Cottontail Pass Alternative and Short Route were both new proposals and had not been previously analyzed. Appointments were made and interviews conducted with the permittees in all affected allotments. Appointments were conducted with the aid of allotment specific maps that showed existing BLM improvements, and the most current rendition of either the DOE Caliente Corridor alignment or the new alternatives were identified. It should be noted that in nearly every case, the permittees identified many more improvements than those that had been documented by BLM. The permittee-identified improvements were mapped by hand on the allotment maps. The interview team then went through the entire list of "Issues Evaluated" (see Section 4.1) with each permittee. Allotment specific analyses were developed based on the content and information gathered from these interviews.

In order to standardize the interviews, some assumptions were made. It was assumed that the rail corridor would consist of a rail bed and single associated access road located on the common raised rail bed. The final alignment of the rail would occur somewhere within the mapped quarter mile strip, and the minimum construction width was 1,000 feet. Despite RCI's requests for information from the DOE, there were certain items that were not known. Key issues that were not clear during the interview and analysis portion of the report included any and all construction details, associated operations infrastructure, and operations criteria, specifically the number of trains and train speeds. DOE did not indicate if fencing of the ROW would be optional, or required. As such, Permittees were asked their preference for either fencing or not fencing the right-of-way (ROW) and the balance of the impacts and mitigations were based on that decision. A change in any of these assumptions, particularly a change in fencing preference, would likely result in a much different set of impacts and mitigations. For that reason, it is imperative to view the impacts and mitigations discussed in Chapter 4 as fluid and subject to change as details of DOE's design, construction activities, and operational criteria are presented.

All of the allotment analyses are contained in Volume II, Appendix 2.0 of this Report. The allotment analyses served as the foundation for the Public Lands Grazing Analysis portion of this report, as discussed in Section 4. The data from the allotment specific analyses were compiled and analyzed by route to determine impacts and mitigation. Ultimately impacts of each alternative were compared in Section 4.5.

2.3 PRIVATE PROPERTY IMPACTS ANALYSIS

The impacts to private property owners along the DOE proposed Caliente Rail Alignment and Alternatives, Cottontail Pass Alternative, and the Short Route were evaluated for this report. The DOE's timetable for releasing the DEIS-RA did not allow for a full-fledged study of the fiscal, economic, social, land use, cultural, aesthetic, public services and other impacts. Therefore, the methodology involved primarily interviewing those private property owners along the rail corridors included in this study to collect their thoughts and reactions.

The precise alignment is still unknown, making it difficult to effectively evaluate the potential impacts to private property. Therefore, four buffer zone areas were established: The first is within 50 feet on either side of the preferred alignment and alternatives, as they are understood to be. The other buffer zones were 200 feet, 500 feet, and one-half mile on either side of the alignments and alternatives. Literally hundreds of parcels fall within the mile-wide corridor. A more manageable number lie within the other buffer zones. Impacts from construction, staging yards and other facilities were not evaluated at all and could likely impact properties outside the 500 foot buffer zone.