YUCCA MOUNTAIN: NUCLEAR FUEL LOCATIONS AND ASSOCIATED RAIL FACILITIES

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I. INTRODUCTION

Statement of Goals

Under the Nuclear Waste Policy Act of 1982, the Department of Energy has considered the suitability of the Yucca Mountain, Nevada site as a repository for nuclear materials. As of February 26, 2009, President Obama’s draft budget removed funding for the planned nuclear waste storage facility. While the current federal administration does not favor the site, its use remains a possibility subject to legal, political or judicial resolution.

Understanding that nuclear waste is present at numerous sites throughout the United States (U.S.) as indicated on “Nuclear Waste Sites Nationwide”, nine of those sites, located in California, Arizona, Oregon, Washington and Idaho, are of interest to Churchill County. If nuclear waste were to be removed from these sites for permanent disposal, the County was interested to learn more about the possible routing for the portion of the route that would be transported via rail. “Nuclear Fuel Locations” illustrates the nine sites and their proximities to Churchill County. Union Pacific Railroad (UP) and Burlington Northern Santa Fe Railway Company (BNSF) are the two Class 1 freight railroads that serve the western United States. Those Class 1 railroads’ routes are illustrated on the map as well. Various short line railroads extend the reach of the two Class 1 railroads through their ownership and operation of branch lines that connect to the Class 1 main lines and serve more remote locations.

The railroad main line through Churchill County is Union Pacific’s east/west main line which traverses the northwest corner of the County. “Railroad Routes” shows this main line and other transportation routes in the State of Nevada. “Vicinity Map” shows railroad and primary highway routes within Churchill County.

If nuclear waste were shipped via rail from various U.S. points of origin to the Yucca Mountain disposal site in southern Nevada, the two routes that have been under consideration are the Caliente Route and the Mina Route. The potential Mina Route would entail completing a rail connection from Churchill County to Yucca Mountain via the Walker Tribal Reservation. In the event the Mina route was not chosen, waste shipments would traverse Churchill County and the Hazen area in route to the proposed Caliente rail route.

II. SCOPE OF THIS STUDY

The nine sites having spent nuclear fuel materials which were considered are listed below. For each site, mapping and available base line data on railroad infrastructure at the site was collected. Four of these sites are presently open and operational; four are closed and are now used for power generation; and one was cancelled prior to becoming fully operational.

1) Palo Verde Nuclear Generating Station, Arizona: Open.
2) Diablo Canyon Power Plant, California: Open.
3) Humboldt Bay Nuclear Power Plant, California: Closed.
4) Rancho Seco Nuclear Generating Station, California: Closed.
5) San Onofre Nuclear Generating Station, California: Open.
6) Idaho National Engineering Laboratory, Idaho: Open.
7) Trojan Nuclear Power Plant, Oregon: Closed.
8) Hanford Site, Washington: Closed.

To the extent it was available, information on the following topics was collected:
- Existing rail service (condition of track and rail traffic).
- Existing facilities on each site.
III. BACKGROUND

The Union Pacific Railroad main line passes through Churchill County on a route between Reno and Salt Lake City. The main line is a single track and is maintained in strict accordance with Federal Railroad Administration (FRA) guidelines. The FRA has established guidelines and standards which set the requirements for maintenance based on track speed. This section of main line track is maintained to FRA standards allowing 79 miles per hour for passenger trains and 60 miles per hour for freight trains. Track vertical grades are typically less than one percent along the route through Churchill County due to the flatness of the topography. The railroad’s right-of-way width is typically 100 feet with some sections that may have a 200 foot width. No public agency or private access in the right-of-way or across the tracks is allowed without written permission from the railroad. Since the mid-1990s, Union Pacific has been required by the Surface Transportation Board to allow Burlington Northern Santa Fe Railway Company trackage rights over this segment of the UP main line. This was a condition of approval for allowing UP to purchase the former Southern Pacific Railroad. This condition of purchase provided for the continuation of competition within this corridor. There are a number of existing sidings along the main line. The sidings are used by the railroad to allow space for trains to meet and pass and also allow for temporary and periodic rail car storage.

Union Pacific uses this main line to transport intermodal trains and manifest freight trains between eastern and western locations. The main line presently carries about 16 to 24 trains per day with a maximum running speed between 60 miles per hour for freight and 79 miles per hour for the two daily Amtrak passenger trains. Manifest freight trains typically consist of about 80 to 150 rail cars and carry a mix of commodities such as coal, lumber, auto parts, finished automobile products, construction materials, propane, ethanol and ammonia. During the past two decades intermodal shipments (containers on flat cars) carrying various products from China have been using this route.

The Fallon branch line is a segment of track that extends from the main line to the east and ends in Fallon. The line’s function is to serve two industrial customers located in Fallon. Union Pacific is supportive of the relocation of these customers to any site west of Fallon so that the east end of the Fallon branch line could be abandoned. The removal of a number of at-grade crossings in downtown Fallon would benefit Churchill County by allowing the City and/or County to negotiate a purchase of the UP right-of-way.

The Mina branch line is a segment of track that extends from the main line to the southwest and extends to approximately the Hawthorne Depot. The Mina branch line carries about two trains per day that run at speeds of about 20 to 25 miles per hour.

In subsequent sections of this report, each plant is briefly described along with aerial photographs and maps to depict the facilities, existing track and other local information. A discussion of possible rail transport routes is included, although there is some variability in the actual route that would be used. Rail haul agreements with railroads and their customers are based upon point of origin and destination, but routing, timing and blocking of rail cars in order to assemble a full train are at the discretion of the Class 1 railroad or short line. Weather conditions, volume, and track congestion can cause railroads to re-route cars along alternate routes without notice to customers. As the U.S. railroads have consolidated over the past several decades, in many cases a railroad owns track or possesses track haul rights to allow some flexibility about the route used.
The railroad’s selection of routes in many instances would likely be based on the following factors:

- **Safest Route:** The most critical factor and defined by the following:
  - The best track conditions: least adverse track grades, least difficult horizontal track geometry, numbers and ratings of bridges/culverts along the route (the least numbers of bridges/culverts and best ratings/conditions of those bridges/culverts), most sidings.
  - Least congestion: least train traffic (especially least passenger traffic).
  - Greatest avoidance of population centers: minimal length of passage through or near populated areas, minimal road crossings. Population centers also give rise to greater political pressures against using the route, and greater risk of incident/terrorism, etc).
  - Greatest avoidance of sensitive environmental areas: least proximity to rivers/waterways or other environmentally sensitive areas.
  - Similar common sense type factors that you might expect when carrying materials that are hazardous.

In terms of track condition, grades, geometry and classification of track, both routes identified (Caliente Route and Mina Route) are about the same, so where we have shown two possible routes, both are about equivalent in terms of pure track condition factors. Given these considerations, it would be unlikely the Feather River Branch Line would be used in lieu of the Donner route especially since the Donner route has been recently improved.

- **Positive Train Control (PTC):** The railroads are now on a timeline to deal with the PTC mandate the government put in place as a requirement following the Metrolink train collision in LA. The railroads have somewhat developed their sequence of installation of PTC facilities for the next few years. This could have some bearing on route choices for the next few years until PTC is fully in place everywhere.

- **Radioactive Waste Transport:** The railroad would not work alone in making the decision about the route. The Surface Transportation Board (STB) would have some involvement in the decision, and it is likely the Department of Homeland Security would be involved as well.

- **Regular Freight:** Some consideration would be given to choosing the shortest or fastest route; however, this would likely not be a driving factor with the route selection for radioactive waste. If the STB, Homeland Security, and the railroad determined that the longer route was the safest based upon the above considerations, then this would not at all be bad news for the railroad, and would likely mean they could get paid more for the transportation and feel the assurance that they are using the lowest risk route. It is desirable to get hazardous material from point A to point B as quickly as possible, but the difference in time between routes does not seem like it would drive the decision in this case.
Legend

Railroads
- Burlington Northern Railway Company
- Union Pacific Railroad
- All Other Railroad Companies

Nuclear Fuel Locations
Sites storing spent nuclear fuel, high-level radioactive waste, and/or surplus plutonium destined for geologic disposition.

NUCLEAR WASTE SITES NATIONWIDE
Legend

Railroads
- Burlington Northern Railway Company
- Union Pacific Railroad
- All Other Railroad Companies

Nuclear Fuel Locations’ Status
- Canceled
- Closed
- Open

NUCLEAR FUEL LOCATIONS