

Radiation Exposures From High-Level Nuclear Waste Transportation from Charlotte to Yucca Mountain

**A Report by the Blue Ridge Environmental Defense League
June 4, 2002**

Part One

Irradiated fuel shipments from nuclear power plants near Charlotte would expose members of the public to radiation in several ways:

1. An accident may cause a breach of the shipping container. The United States Department of Energy predicts an accident rate of 11.9 rail accidents per million shipment miles, or an accident every 84,000 miles. For trucks the figures are 0.7 – 3.0 accidents per million shipment miles, or an accident roughly every 540,000 miles,
2. Sabotage of a shipment can cause the release of radionuclides. Acts of sabotage incidents are more difficult than accidents to forecast, but we must assume that terrorist attacks can occur, if only because they are designed to inflict maximum human injury, and
3. Routine exposures to radioactivity occur when gamma rays and neutron radiation pass through the shielding of the transport container. This phenomenon is a product of the high energy of the radiation in irradiated fuel and the inability to build a transport device which shields from the radiation. A GA 4 truck cask with four PWR conventional fuel assemblies would contain 850,000 curies. The NAS-TSC rail cask with 26 assemblies would hold 5.5 million curies.

According to estimates done for the state of Nevada, 193 rail shipments would leave Catawba and 211 shipments would leave McGuire. If truck transport is substituted for rail (carrying 4 fuel assemblies instead of 26), the number of shipments would increase to approximately 1,255 and 1,372, respectively. So, a total of 404 rail shipments or 2,627 truck shipments would exit Catawba and McGuire en route to Nevada.

The routes and methods of transport would be determined by the utility and the federal government, but the principal transport routes west are well known. Trains carrying nuclear waste from Catawba would use the Norfolk Southern rail line and travel through Rock Hill, Charlotte, and Gastonia. The shipments would go to Blacksburg and Spartanburg, SC and re-enter North Carolina to follow the French Broad River through Asheville and Marshall bound for Tennessee. Nuclear waste trains from McGuire would use the CSX rail road from Lake Norman through Mount Holly, Bostic, and Marion before leaving western North Carolina. Highway shipments from Catawba would follow a similar route via Interstates 77 North, 85 South, 26 West, and 40 West. Likewise, McGuire truck transports would follow Interstates 77 South, 85 South, 26 West, and 40 West.

In 1995 the U.S. Department of Energy analyzed high-level nuclear waste transport radiation exposures for shipments from overseas research reactors to the United States which reveal that routine, incident-free radiation doses to transport personnel and the public would far exceed risks from accidental exposures. The DOE stated, “[I]t is clear that the incident-free dose would be much higher than the accident does for each of the fuel types.”

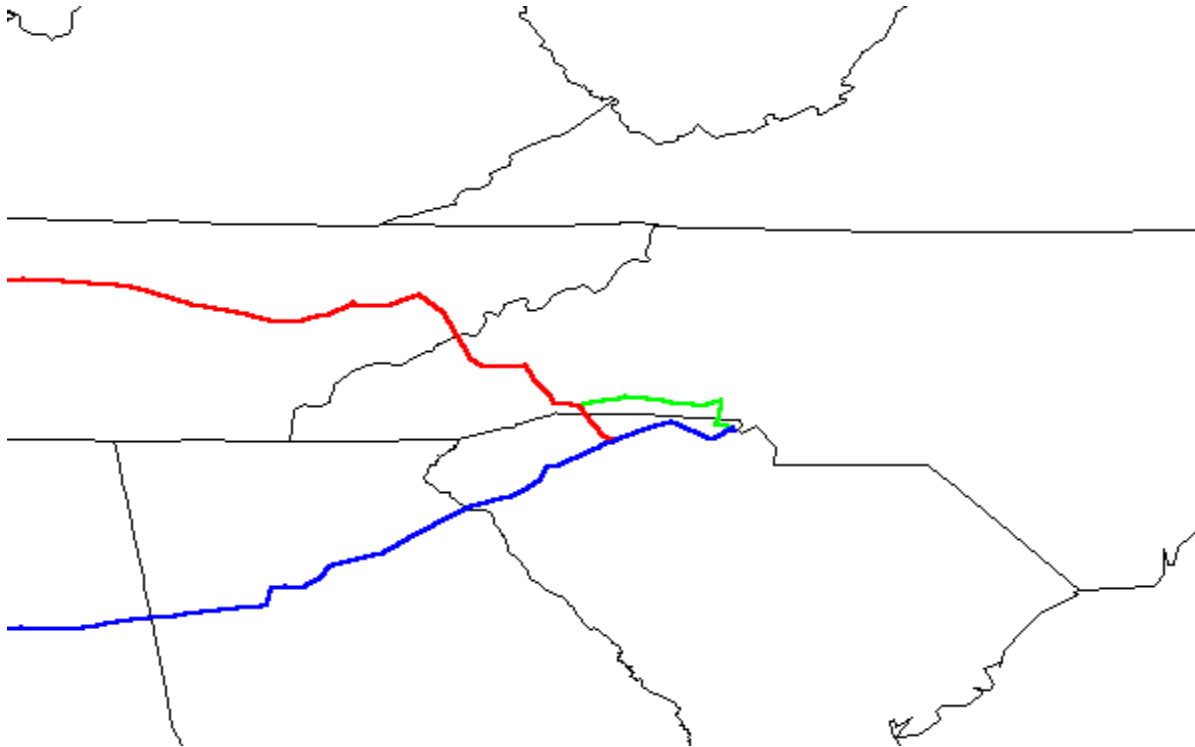
Part Two

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Catawba Nuclear Power Plant to Yucca Mountain

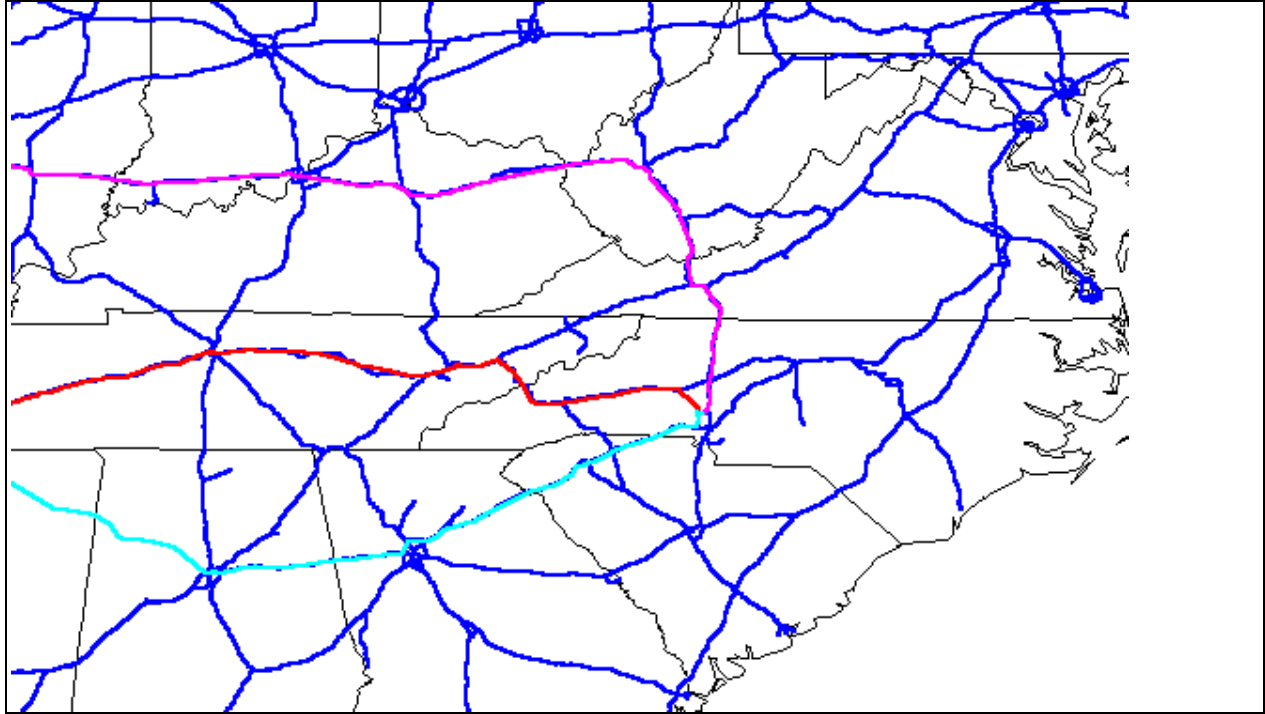
The primary route would likely follow Interstate 40, the scene of a major bridge collapse in Arkansas last week. Characteristics of this route include:

- 14.9 miles of travel in South Carolina followed by 151.8 miles in North Carolina
- Travel in Western North Carolina is through mountainous terrain;
- Approximately 76,939 live within 800 meters (approximately ½ mile) of the route;
- Total miles to Yucca Mountain is 2281 miles;
- Population within ½ mile of Yucca Mountain is an estimated 722,904 people;



McGuire Nuclear Power Plant to Yucca Mountain

The primary route would likely follow Interstate 40. (See Figure Below). Characteristics of this route are similar to the Catawba route except for 33 miles of travel on North Carolina State Highways before accessing Interstate 40 at Conover.



Rules Governing Shipments of Radioactive Materials.

The NRC's regulations for transporting radioactive materials is found in 10CFR71 (Section 10 (?) Of the Code of Federal Regulations, Part 71).

Section §71.47 defines "external radiation standards for all packages," and states that

"Each package of radioactive materials offered for transportation must be designed and prepared for shipment so that under conditions normally incident to transportation the radiation level does not exceed 2 mSv/h (200 mrem/h) at any point on the external surface of the package, and the transport index does not exceed 10."

The term "normally incident" is not readily defined by the NRC, but probably refers to routine operations.

Second, one hour dose rates greater than 50% of the average background level of radiation in the U.S. (Commonly reported as 360 millirems) are permitted by the NRC on the surface of the transportation container.