

The following article focuses on a primary shipping conduit in the Nuclear Heartland – the intersection of I-40 and I-26 at Asheville, in the mountains of Western North Carolina. I-40, a primary east-west route links the Atlantic Seaboard from the Port of Wilmington in North Carolina with points West, nearly to Los Angeles and the Pacific. I-26 was recently extended to link the Port of Charleston to points North and East via I-81 and the Great Lakes via I-75. Asheville is the [Crossroads of the Nuclear Heartland \[insert link to that NIRS fact sheet please\]](#)

The I-26 Nuclear Connection

by Michael Hopping

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My first stop in researching the local traffic in radioactive substances related to national defense or nuclear power was a community fire hall. I went there to study the Emergency Response Guidebook that accompanies firefighters and EMS personnel to the scene of traffic accidents. I was disappointed to find that much of the information pertaining to nuclear cargoes is reassuring boilerplate. In the event of a large spill of depleted uranium (the stuff used in armor-piercing bullets), emergency personnel are advised to clear the downwind area to a distance of 100 meters or more. The same distance is recommended for a large spill of fissile (potentially chain-reacting) substances. These are otherwise known as weapons-grade plutonium or uranium.

I asked one of the young firefighters on duty how he approaches a big rig accident. He said, "We find some high ground upwind and get out the binoculars. We don't go up on a truck wreck unless we know what's inside. If it's hazardous material or we can't find the number code identifying the load, we call the HAZMAT specialists at Asheville City Station #2 and let them deal with it."

Industrial quantities of many non-radioactive materials have a history of killing far more people in the United States than nuclear spills. So nuclear shipments aren't foremost on his list of HAZMAT worries. But mishaps involving radioactive cargo do occur. A leak of uranyl nitrate, a liquid uranium compound, occurred on I-26 south of Asheville in 2004. This was a comparatively minor spill. The potential disaster zone for worst-case scenarios involving some nuclear loads can extend outward in years as well as miles. We know that Asheville highways carry nuclear loads, up to and almost certainly including nuclear weapons. Such traffic will increase if the United States presses ahead with plans to build new nuclear weapons and nuclear power plants. This possibility may partially explain the federal interest in completing the I-26 connector. A wider road between the dangerous I-40 junction and the equally tricky Smoky Park Bridge would do much to relieve a bottleneck along an important nuclear corridor.

Though the kids may not believe it, the interstate highway system was not built with their summer vacation torment in mind. President Eisenhower was thinking Cold War and national defense when he signed the National Interstate and Defense Highways Act of 1956. How much do our local interstates contribute to the national defense? Security concerns render detailed answers difficult to come by. But it is possible to shed some

light on what might be in the truck next to you on the highway.

An allegation

On the basis of Department of Energy (DOE) environmental impact statements associated with planned federal movements of uranium, plutonium, tritium, and related substances, Mary Olson of the Nuclear Information and Resource Service estimates that such shipments pass through Asheville on at least a weekly basis. This is largely because I-26, I-40, and 19-23 North (to I-26 in Madison County) connect some of our most vital national defense sites. They include:

The **Y-12 National Security Complex at Oak Ridge**, just west of Knoxville, Tennessee. Y-12 is the only original US atomic bomb factory still in operation. It refurbishes nuclear weapons in addition to performing other nuclear functions. The **Watts Bar reactor** down the road from Oak Ridge. It supplies tritium, the radioactive hydrogen that puts the H in H-bomb. **Nuclear Fuel Services in Erwin, Tennessee**, across the state line from Madison County. This private company "downblends" weapons-grade uranium for use in nuclear fuel rods. Next door to Erwin, at **Jonesborough, is a depleted uranium munitions factory. The Savannah River Site**. It sits on the South Carolina side of the Savannah River, more or less across the water from Augusta, Georgia, and the Master's Golf Tournament. The Savannah River Site is a huge DOE reservation and industrial park for federal nuclear projects. The Barnwell low-level nuclear dump is close by.

Skepticism

I called Lt. Mark Dalton, Hazardous Materials Coordinator for the North Carolina Highway Patrol, to ask whether Olson's weekly shipment figure sounded right to him. It didn't. "Medical or industrial shipments of radioactive material probably occur on a daily basis," he said, "but potentially dangerous quantities or substances, designated Highway Route Controlled Quantities (HRCQ) are rare."

The Highway Patrol is notified about these, he said, whether they are commercial or DOE. Just to be sure, he promised to check with his contact at the Savannah River Site. When he called me back he said he'd been assured that DOE has no current "campaigns" (shipping operations) traveling through Western North Carolina.

How could this be, I asked, reminding him of the uranyl nitrate leak on I-26? The truck was headed from Nuclear Fuel Services to the Savannah River Site. Dalton said that wasn't a DOE shipment. This was my introduction to the "need to know" shell game involving tractor-trailers and radioactive payloads.

Other sources

The Tri-State Motor Transport Company has been moving nuclear materials for the federal government, says Tri-State Executive Vice President David Bennett, "since the days of Hiroshima and Nagasaki. We were awarded License 00001 for transporting nuclear materials." At present his company hauls several types of radioactive cargo through the Southeast, including two to four loads per week of "legacy transuranic waste" (material contaminated with plutonium and other radioactive elements heavier than

uranium) from the Savannah River Site to the Waste Isolation Pilot Project near Carlsbad, New Mexico.

Bennett told me these shipments are classed as low-level waste and therefore aren't considered HRCQ shipments. They travel west via Atlanta and are not escorted. Tri-State drivers are familiar with I-40 and I-26 as well. Bennett told me that about twice a week, his company hauls unescorted loads of enriched (3-7% U-235) uranium hexafluoride or uranium oxide bound for the Global Nuclear Fuels-Americas plant in Wilmington. Bennett didn't have specific figures about how many of these trucks pass through Western North Carolina. But he confirmed that the bulk of the uranium hexafluoride originates at DOE's Paducah Gaseous Diffusion Plant in Kentucky. He said I-40 is a route for these shipments and that the new section of I-26 through Madison County is a permissible alternate in the event of problems on I-40. A truck using this alternative route would reconnect with I-40 at Asheville.

Uranium hexafluoride is a treble dangerous cargo. Radiation is the least of the HAZMAT worries associated with it. This compound reacts violently with water and releases a lethal fluorine gas in the process. Bennett downplayed the risks, saying that there have been no uranium hexafluoride releases in highway accidents. Nuclear Regulatory Commission reports of two wrecks involving Tri-State uranium hexafluoride shipments in 2003 are consistent with his statement. One of these occurred in Montana. The other load overturned on I-40 just west of Knoxville. The containment vessel was damaged in that one, but no radiation leaks were detected.

Bennett told me that Tri-State has also transported highly-enriched weapons-grade uranium from the Savannah River Site to Nuclear Fuel Services where it is downblended" into nuclear fuel rods. These uranium shipments are or were done under contract with the secretive National Nuclear Security Administration (NNSA) and are escorted by armed guards. NNSA is a semi-autonomous authority within the Department of Energy. Its website proclaims that since its inception in 2000, it has had primary responsibility for "enhancing national security through the military application of nuclear energy." NNSA spokesman Bryan Wilkes had a more homely way of putting it. "We own the bombs. The Department of Defense borrows them from us."

NNSA's in-house transport division is the Office of Secure Transportation. Webpages for that office supply some security generalities, such as the presence of inconspicuous armed federal escorts.

Aspiring nuclear cowboys may be interested to learn that the Office of Secure Transportation is hiring.

Wilkes regretted he couldn't talk with me about some of the security measures NNSA uses-the packaging system for the tritium being shipped from Watts Bar to the Savannah River Site struck him as particularly ingenious. A conference report on Tritium Producing Burnable Absorber Rods available on a DOE Office of Scientific and Technical Information website is more informative. It includes sketches of the rods and

containment system in addition to data on the radiation emitted by tritium and the host of other radioactive substances involved. I-40 and I-26 would be a logical route for these shipments. And, after the tritium is purified, Asheville may see it again as it travels to nuclear weapons factories such as Y-12 at Oak Ridge.

Wilkes wouldn't address those speculations other than to say, "The NNSA makes no public comment about any shipments." Except in special cases, he said, the NNSA information blackout extends to state officials. So Wilkes didn't discuss the Tri-State shipments of uranium to Nuclear Fuel Services and had no comment on whether fuel rods travel back through Asheville destined for Navy submarines moored at Charleston. He definitely had nothing to say about movements of nuclear weapons. But Stewart Coates, the Director of Emergency Services for Madison County, says the Madison County section of I-26 is the secondary route for nuclear weapons passing through our mountains, presumably on their way to or from a refurbishment at Oak Ridge. His understanding is that these weapon shipments are not allowed to stop for any reason except on a secure military reservation. So, when traffic is dicey along I-40 through the Pigeon River Gorge, the transports go through Madison. Though Coates, who doesn't get his information from NNSA, says weapons shipments through his county have been uncommon, they have been frequent enough for fire and EMS personnel to recognize the trucks and escort vehicles. Because of increased sightings of known escort vehicles in recent months, he wonders if NNSA is considering a change of primary route. Obviously, if such a change occurred, I-240 would see an increase in nuclear weapons traffic.

Weapons-grade plutonium is also moving around, most likely in Office of Secure Transport vehicles. NNSA plans call for the "elimination" of up to 50 tons of surplus US plutonium at the Savannah River Site. Much of this will have to travel to get to South Carolina. There, it may be used to make hydrogen bomb triggers or mixed with enriched uranium to produce MOX fuel, a new type of fuel rod for use in commercial applications.

This list of radioactive shipments is probably far from complete. Tri-State Motor Transport isn't the only private contractor hauling radioactive loads. Hittman Transport Services is another company in the business. George McGrath, spokesman for Hittman's parent company Duratek, told me Hittman averages 10-12 unescorted tractor-trailer loads of low-level nuclear waste through Asheville per week. The waste comes from nuclear power plants and other commercial and federal contracts. McGrath said Hittman does not handle nuclear fuel shipments, HRCQ loads, or NNSA subcontracts.

Today and tomorrow

Incomplete as it is, this listing gives us some idea of what we're dealing with today. If the United States resumes production of nuclear weapons or builds more nuclear power plants, tomorrow's nuclear traffic will necessarily increase. Progress Energy has already announced plans to build two new reactors at undisclosed locations in the Carolinas. One of Duke's Catawba reactors outside Rock Hill, South Carolina, will be the first American nuclear power station to experiment with MOX fuel.

These developments raise our country's other major nuclear transportation dilemma, what to do with spent nuclear fuel, the nastiest radioactive stuff of all. By 2035, the United States is expected to have more than 100,000 metric tons in need of disposition. If a permanent storage site is opened at Yucca Mountain in Nevada or elsewhere, containers of spent fuel from the Duke Power and Progress Energy plants east of Asheville will go west by road or through Biltmore Village on Norfolk-Southern rails. It would be naïve to think that federal nuclear initiatives don't reverberate in other sectors, including construction priorities for interstate highways. "I-3," another recently announced plan for highway construction in the Southeast, would begin in Savannah, go past the Savannah River Site, avoid Atlanta, and terminate in West Knoxville, where I-140 intersects I-40. From there, Highway 162 is a straight shot into Oak Ridge. Backers of I-3 don't list national defense considerations among their reasons for supporting the new road, but the route speaks for itself. Compared to I-3, the I-26 connector is small potatoes, but it may well share I-3's unspoken federal rationale. At the very least, it's something to think about in addition to six lanes or eight. We can be assured that the EMS personnel sitting on the hill studying an overturned and burning tractor-trailer rig through their binoculars will not be overlooking the nuclear possibilities.

Sidebar

Nuclear Isotopes and Radiation

The world of radioactive substances is complicated. When most of us think "radiation" we're thinking about gamma rays. Like visible light and X-rays, they're electromagnetic waves. They travel and can do damage over great distances. Nuclear fuel, especially spent nuclear fuel, is a major gamma ray emitter. Other substances decay by emitting ionized bits of broken atoms, alpha or beta particles, instead. These particles don't travel far and have trouble penetrating skin. They become dangerous if eaten or inhaled. In the lung, a microscopic particle of plutonium, an alpha emitter, is likely to cause lung cancer. The most significant public health risk posed by the I-26 spill of uranyl nitrate would have been uranium dust from the dried droplets kicked up by the tires of passing motorists.

Heavy metals also carry non-radiological toxicities. **Uranium**, for instance, is known to be hard on kidneys. The extensive use of **depleted uranium** munitions in Iraq and elsewhere will unfortunately add much to the medical understanding of uranium's heavy metal consequences in the human body. A word about "**low-level waste.**" This is a catchall term. It covers hospital trash associated with nuclear medicine services, discarded nuclear power plant filters and reactor parts, and even machinery contaminated with plutonium dust. Here's a brief description of some of the substances mentioned in the accompanying story.

Plutonium is very rare in nature. Almost all of it is synthetically created through decay of other elements. It is, for example, a byproduct of nuclear power plant operation. Plutonium comes in different "isotopes", atoms with different numbers of neutrons.

Weapons-grade plutonium, the type that makes hydrogen bomb triggers and may be used in the manufacture of MOX fuel, is 90% pure Pu-239. Pu-239 is the famous alpha-emitting carcinogen.

Tritium is a radioactive form of hydrogen gas. It is a rare natural variant of hydrogen, but most is produced as a byproduct of nuclear power plant operation. Tritium emits beta particles. Uranium also comes in several "isotopes." U-235 is the form used in atomic bombs. Weapons-grade uranium is greater than 90% U-235. Uranium hexafluoride and uranyl nitrate are also high in U-235. Depleted uranium is almost all composed of the alpha particle emitter, U-238. Spent nuclear fuel is a brew of uranium, plutonium, and several other radioactive metals produced by a controlled nuclear chain reaction. It gives off tremendous amounts of heat in addition to gamma rays and alpha and beta particles.

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