

**From:** Kevin Kamps <kevin@beyondnuclear.org>  
**Sent:** Tuesday, November 3, 2020 10:44 PM  
**To:** WCS\_CISFEIS Resource  
**Subject:** [External\_Sender] Beyond Nuclear's 29th set of public comments, re: Docket ID NRC-2016-0231, and report number NUREG-2239, NRC's ISP/WCS CISF DEIS, re: A Cautionary Tale: MOBILE MELTDOWN - TMI TRAIN TROUBLES

Dear NRC Staff,

We submit these comments on behalf of our members and supporters, not only in New Mexico and Texas, near the targeted ISP/WCS CISF site, but across both of these states, and the rest of the country, along road, rail, and waterway routes that would be used for high risk, highly radioactive waste shipments to ISP/WCS's CISF, as well as to Yucca Mountain, Nevada, on Western Shoshone land -- wrongly and illegally assumed by ISP/WCS, as well as by NRC, to someday (or some decade, or some century) become a permanent disposal repository. This unnecessarily repeated, multiple legged, cross-continental transport of highly radioactive waste, is another significant aspect of the EJ (Environmental Justice) burden associated with this ISP/WCS CISF scheme.

The following subject matter has gotten little to no attention in NRC's ISP/WCS CISF DEIS, a far cry from NEPA's legally binding "hard look" requirement:

### **A Cautionary Tale: MOBILE MELTDOWN - TMI TRAIN TROUBLES**

Several of the very small number of ISP proponents who submitted verbal comments on the four NRC call-in sessions, all of whom were nuclear power industry representatives, made comments suggesting that the industry has a spotless record of transporting highly radioactive irradiated nuclear fuel in the U.S., over the course of decades. The following article, which we co-authored, written in 2004 to mark 25 years since the Three Mile Island Unit 2 meltdown, documents numerous incidents involving the TMI-2 melted down irradiated nuclear fuel, as it passed through the St. Louis, MO metro area, en route from Pennsylvania to "temporary storage" in Idaho, where it remains still. (Kevin Kamps served as Nuclear Waste Specialist, and Kay Drey as Board of Directors member, at NIRS in 2004.) As our article documents, the nuclear power industry's record on shipping irradiated nuclear fuel and highly radioactive wastes is far from spotless. Serious safety and security concerns are raised by these cautionary tales documented below.

The article is linked here, and pasted in, in full, below.

# MOBILE MELTDOWN - TMI TRAIN TROUBLES

Nuclear Monitor Issue:

#605-606

Special Issue: 25 Years Since the TMI Disaster

12/03/2004

Article

(March 12, 2004) TMI-Unit 2 became operable in March 1978 but due to numerous problems and shutdowns, the reactor had operated effectively for just three months prior to the accident. During the accident, the relatively new fuel came within half an hour of melting through the reactor vessel, the precursor for the proverbial "China syndrome," in which the fuel would burn its way down to the underground water table, causing massive radioactive steam discharges in the environment.

**(605-606.5590) NIRS** - Five years after its meltdown, the reactor vessel head from TMI-2 was removed and between 1985 and 1990, the reactor was partially "defueled." A portion of the fuel that had melted then turned into a hardened mass was chopped out of the reactor vessel, to be shipped off to Idaho for "interim" storage. At one point, the workers responsible for removing the fuel had to stop because they could not see through the vessel coolant water. A population explosion of mutant microorganisms ("algae, fungi, bacteria, and aerobic and anaerobic organisms") was apparently thriving in the highly radioactive water, making it opaque and clogging up the filters. After trying various unsuccessful and unsafe biocide concoctions, massive infusions of hydrogen peroxide finally restored visibility. (1)

It should be noted that not all the irradiated nuclear fuel was removed from the destroyed TMI core. In August 1993, Dr. Michio Kaku, professor of Nuclear Physics, City University of New York, evaluated studies conducted or commissioned by GPU [General Public Utilities, then-owner of the TMI plant] and the NRC on the amount of fuel left in TMI-2. "It appears that every few months, since 1990, a new estimate is made of core debris, often with little relationship to the previous estimate....," Dr. Kaku concluded. "...[E]stimates range from 608.8 kg to 1,322 kg [1,342 pounds to 2,915 pounds]... This is rather unsettling... The still unanswered questions are therefore: precisely how much uranium is left in the core, and how much uranium can collect in the bottom of the reactor to initiate re-criticality." (2) Eric Epstein of TMI-Alert told the authors of Critical Hour (see book review) that as of 2003, no more was known about the quantity of fissile debris remaining in the core. The utility says it will keep the facility in long-term, monitored storage until the operating license for the TMI-1 reactor expires, at which time both reactors will be decommissioned. However, the expiration date of 2014 could be extended until

2034 if Exelon applies for what has become a near automatic license extension from the U.S. Nuclear Regulatory Commission (NRC). (3)

The removed portion of the severely damaged nuclear fuel was transported by train to the Department of Energy's (DOE) Idaho National Engineering Lab. (INEL) and between 1986 and 1990, at least 22 separate shipments were conducted through states between Pennsylvania and Idaho. All passed through St. Louis, Missouri. The two dozen shipments involved not only broken fuel rods, but also broken promises, speed limits and safety requests that bode ill for the nuclear establishment's Yucca Mountain dump scheme.

The DOE was in charge of these TMI-2 fuel debris shipments, just as it would be in charge of the Yucca Mountain shipments. DOE and the train companies hired to haul the high-level radioactive waste (HLRW) casks to Idaho were asked by the City of St. Louis not to exceed 35 miles (56 km) per hour, however, TMI-2 shipments were observed traveling at 65 (105 km) mph. A promise was made to St. Louis area officials that TMI-2 trains would not pass through the metropolitan area during rush hour, but this agreement was also violated. (4) DOE continues to violate agreements with Missouri to date. In June 2001, three truckloads of irradiated fuel from a German research reactor en-route from South Carolina to Idaho passed through Missouri population centers during rush hour, and pulled over at an unauthorized location during a fierce rainstorm, again contrary to prior agreements. (5)

The federal Environmental Assessment for the TMI-2 shipments had assumed only one high-level radioactive waste cask per train shipment. The "Finding of No Significant Impact" equaled a green light for the shipments to proceed and indeed, the very first shipment, which passed through St. Louis on July 22, 1986 carried only one cask. Though just over two months later the second shipment carried two casks, an unanalyzed condition that was repeated numerous times by shipments carrying two and sometimes three casks.

The shipping casks themselves also posed problems, during both design and fabrication. For example, residual water was unavoidably entrapped in the shipping canisters during fuel loading. The release of hydrogen and oxygen gases caused by the exposure of the water molecules to radioactive particles and rays emitted by the fuel, known as radiolysis meant "recombiner catalysts" had to be installed in each fuel canister to combine the gases back into water, in an effort to reduce the generation of combustible gas mixtures. Some of the canisters were also found to have defective O-rings - the type of seal blamed for the 1986 Challenger space shuttle disaster. (4) Borated neutron-moderators had to be included in the canisters to protect against a criticality accident. Such precautions against inadvertent chain reactions in the still-fissile HLRW are necessary in most shipping containers, although the amount of borated neutron moderators required should vary with the quantity, age, enrichment level, history and condition of the irradiated fuel.

Perhaps the most dramatic accident involving TMI-2 meltdown shipments took place on 24 March, 1987 when the train, carrying two HLRW casks, collided with a car that had stalled on the tracks in St. Louis. (4)

The fourteenth shipment through St. Louis, on Feb. 9, 1988 caused another type of anxiety among city officials and emergency responders. The train carried three HLRW casks, separated by "buffer" cars. According to a city official who spoke on condition of anonymity (4), two buffer cars were marked with hazardous materials placards declaring that they contained calcium carbide. Calcium carbide is an unstable chemical that reacts violently with water, generating a highly flammable gas. In case of a fire involving calcium carbide, water must not be used. In addition to being incompatible with moisture and water, calcium carbide must be kept away from strong oxidizing agents, hydrogen chloride, and magnesium. (6) Needless to say, St. Louis officials responsible for public safety were not happy to see flammable calcium carbide cars mixed in with melted down HLRW from TMI!

The officials investigated the buffer cars while the train was stopped in a rail yard in East St. Louis, Illinois. According to some accounts, the substance in the buffer cars turned out to be crushed limestone. Was the buffer car mistakenly marked? Regardless of whether the buffer cars were empty, contained limestone, or actually contained calcium carbide, their placards would have stopped firefighters from using water to douse flames in the event of a fire involving the shipment. HLRW casks are only designed to withstand low temperature fire (1,475 degree Fahrenheit, 800 degrees Celsius) for 30 minutes. Such labeling mistakes could interfere with emergency response, risking harmful radioactive releases. More frightening still, U.S. federal regulations allow HLRW to be shipped by trains carrying mixed freight and could be located between explosives and flammables on a train. For years, DOE - apparently in a bid to save money - has strongly resisted calls by the American Association of Railroads, environmental and public safety groups, and concerned state and local governments to only ship HLRW on dedicated trains. The highways and waterways across the U.S. are also mixing bowls for hazardous, flammable, and explosive shipments that could potentially breach HLRW transport containers in a severe accident.

Another scare was caused by the sixteenth TMI fuel debris shipment, on 24 May, 1988. During a transfer between the Conrail and the Union Pacific train lines, after the Conrail locomotive had been disconnected, the rest of the train - TMI-2 waste casks, buffer cars, and caboose - rolled about 600 feet (180 meters) before a railway worker could run after it, jump aboard, and hand-crank a wheel on top of the train to engage the brakes. (4)

How much radioactivity was contained in these two dozen shipments through St. Louis? The nuclear firm EG&G estimated the radioactivity content at over three million curies. Compare that to the total of two curies of radioactivity used at one time at the world-class Washington University medical center in its thousand labs that use radioisotopes for research! (4)

A secret DOE train shipment carried two casks of damaged fuel rods across the U.S. in July 2003. (7) The shipment originated at the shutdown commercial irradiated-fuel reprocessing facility at West Valley, New York. It very likely traveled through states from Pennsylvania to Idaho (8) before the casks ended up at INEL. There the waste, originally from the Big Rock Point reactor in Michigan and the Ginna reactor in New York, was placed in "interim" outdoor dry-cask storage. This shipment closely followed the route traveled by the two dozen TMI fuel debris shipments over a decade earlier, with an important exception: it apparently bypassed St. Louis to the north, entering Missouri at Hannibal and exiting at Kansas City. (8) Both the TMI

shipments and the West Valley shipment avoided traveling through Chicago. In fact, DOE explicitly stated it had chosen the West Valley shipment route based in large part on "population along the route and potential risk to the public." (9) DOE's Yucca Mountain transport plan does not mandate the avoidance of major population centers. Originally scheduled to roll in October 2001, the shipment was delayed almost two years due to concerns over terrorism (10). In addition, the DOE and NRC agreed that the casks, with uncertified seals, were not to travel between 31 October and 1 April in order to avoid extreme cold weather conditions. (11) In fact, St. Louis would experience one to two truck shipments per day, or two to three train casks per week, on average, for three decades. (12) Rail yards just off downtown Chicago would be subjected to one train cask out of every three train casks bound for Yucca. (13)

According to the NRC, the TMI-2 irradiated fuel debris shipped across the continent is currently stored in dry casks at DOE's Idaho National Lab (14). Given the problems experienced by the two dozen TMI-2 shipments passing through St. Louis, it is frightening to think about the broad range of potential mishaps that could occur if the DOE were to ship many tens of thousands of HLRW casks across the nation to Yucca Mountain. We all need to work to stop this radioactive Russian roulette on the roads and rails before it begins.

**Contact:** Kevin Kamps at NIRS and Kay Drey

**References:**

- (1) U.S. NRC, NUREG-0090, Appendix B, "Update of Previously Reported Abnormal Occurrences," update to Vol. 8, No. 4, as of April 20, 1986, pgs. 41-42.
- (2) Michio Kaku quoted in "Three Mile Island at Nineteen," April 3, 1998, Eric Epstein, Three Mile Island Alert, Harrisburg, PA. See: [www.dep.state.pa.us/dep/PA\\_Env-Her/tmi/tmiEpstein.htm](http://www.dep.state.pa.us/dep/PA_Env-Her/tmi/tmiEpstein.htm)
- (3) [www.nrc.gov/reading-rm/doc-collections/fact-sheets/3mile-isle.html](http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/3mile-isle.html) accessed March 4, 2004.
- (4) Interviews with Kay Drey in University City, Missouri March 2004.
- (5) Bill Bell, Jr., "Holden Says Radioactive Shipment Was Bungled: Governor Charges That Federal Agency Broke Promises on Moving Wastes," St. Louis Post-Dispatch, Nov. 1, 2001.
- (6) According to the Physical and Theoretical Chemistry Laboratory at Oxford University, [www.physchem.ox.ac.uk/MSDS/CA/calcium\\_carbide.html](http://www.physchem.ox.ac.uk/MSDS/CA/calcium_carbide.html), accessed March 4, 2004.
- (7) "Public Interest Groups Criticize Handling of Recent Nuclear Waste Shipment from Western New York to Idaho: Secret Nuclear Shipment Endangered Local Communities," Public Citizen Critical Mass Energy and Environment Program press release, Aug. 11, 2003, [www.citizen.org/pressroom/release.cfm?ID=1523](http://www.citizen.org/pressroom/release.cfm?ID=1523)
- (8) "U.S. Department of Energy West Valley Nuclear Fuel Shipment Routes 12A & 12B," in "West Valley Spent Nuclear Fuel Shipment: Resource Guide," published by Westinghouse West Valley Nuclear Services Company and INEEL Bechtel BWXT Idaho, LLC, for U.S. DOE, undated but mailed to NIRS spring 2001, page 21.
- (9) "DOE FACT: West Valley Spent Nuclear Fuel Shipment Route," a fact sheet, undated but downloaded from

[www.wvnsco.com/Fuel\\_Ship\\_Route.htm](http://www.wvnsco.com/Fuel_Ship_Route.htm)

on Feb. 8, 2001.

(10) "U.S. Dept. of Energy Suspends Atomic Waste Train Due to Terrorist Threat," NIRS press release, Oct. 26, 2001.

(11) NRC Safety Evaluation Reports for the two casks (Docket Nos. 71-9202 and -9206, Revision No. 7), March 19, 2001; personal communication with John Chamberlain, West Valley Nuclear Services/Demonstration Project, New York, July 9, 2001.

(12) DOE Yucca Mt. Final Environmental Impact Statement, Feb. 2002, pgs. J-173 and 174.

(13) Robert Halstead, Nuclear Waste Transport Consultant to State of Nevada Spent Fuel Project office, on CBS "60 Minutes," Oct. 26, 2003. See additional Halstead analyses at

[www.state.nv.us/nucwaste/trans.htm](http://www.state.nv.us/nucwaste/trans.htm)

(14) [www.nrc.gov/waste/spent-fuel-storage/locations.html](http://www.nrc.gov/waste/spent-fuel-storage/locations.html), accessed March 4, 2004.]

Please address and rectify your woefully inadequate "hard look" under NEPA, re: this health-, safety-, and environmentally-significant, as well as legally-binding, subject matter above.

And please acknowledge your receipt of these comments, and confirm their inclusion as official public comments in the record of this docket.

Thank you.

Sincerely,

Kay Drey, President, Board of Directors, Beyond Nuclear

and

Kevin Kamps, Radioactive Waste Specialist, Beyond Nuclear

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Beyond Nuclear aims to educate and activate the public about the connections between nuclear

power and nuclear weapons and the need to abolish both to safeguard our future. Beyond Nuclear advocates for an energy future that is sustainable, benign and democratic.

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