To: The Canadian Nuclear Safety Commission (CNSC) [submitted via: consultation@cnsc-ccsn.gc.ca]

From: Kevin Kamps, Radioactive Waste Specialist, Beyond Nuclear; Board Member, Don't Waste Michigan, representing the Kalamazoo chapter

Re: CNSC Technical Assessment Report: "NAC-LWT Package Design for Transport of Highly Enriched Uranyl Nitrate Liquid (HEUNL)"

Date: February 9, 2015

Dear Members of the CNSC,

Please conduct a top level, comprehensive environmental review before rushing approval of this shipping scheme. Solid irradiated nuclear fuel and high-level radioactive waste is dangerous enough to transport; liquid high-level radioactive waste is even more dangerous to transport.

In addition, the involvement of both the Canadian and U.S. federal governments in this shipping proposal, increases the risks that the shipments will be targeted for terrorist attack. (Dr. James David Ballard, cited below, testified along similar lines as an expert witness, in the environmental coalition U.S. federal court action in Kalamazoo, Michigan in 1999 and 2000, regarding a weapons-grade plutonium shipment from Los Alamos Nuclear Lab in New Mexico, to Chalk River, Ontario.) So too does the fact that the shipments would contain highly-enriched uranium, which if separated from the mixture, is weapons-usable.

As part of a comprehensive environmental assessment, I urge CNSC to carefully consider the following reports and studies conducted by the State of Nevada Agency for Nuclear Projects (a part of the State of Nevada Governor's Office). Granted, Nevada was focused on solid irradiated nuclear fuel and high-level radioactive waste shipments targeted at Yucca Mountain, Nevada. But the insights revealed, and light shone, by Nevada's cutting edge work over the past years and decades, is all the more appropriate, considering the even more risky nature of the proposed shipments: liquid high-level radioactive waste, containing weapons-grade HEU.

After all, shipment of liquid HLRW is unprecedented in North American history – for good reason. It is too dangerous. It is also unnecessary. The HEU could be down-blended to LEU (low-enriched uranium) on-site, safeguarding against nuclear weapons proliferation risks.

Just as well, the liquid HLRW could be solidified on-site at Chalk River, through the "cementation" process that has been carried out there for a decade or more already.

The entire State of Nevada, Agency for Nuclear Project's, Nuclear Waste Transportation website sub-section,

http://www.state.nv.us/nucwaste/trans.htm

is worthy of CNSC's careful review.

Nevada has been doing cutting edge work on the risks of road (truck), rail (train), and waterway (barge) shipments of high-level radioactive waste, for decades, as part of its oversight of the proposed Yucca Mountain deep geologic repository targeted at it, against its will.

There have been some 2,500 to 3,000 shipments of solid high-level radioactive waste in US history. But most of those shipments took place many decades ago. In recent years, the rate of such shipments has slowed to a very small trickle. In many individual years, there are ZERO shipments of solid high-level radioactive waste traveling in the U.S.

Below, I've cited numerous sub-links listed at the site above, specific to high-level radioactive waste transport risks (although the entire site is about that). I urge the CNSC to consider all of Nevada's studies carefully. I also urge CNSC to conduct comprehensive environmental assessment hearings, with full public comment opportunities, given the severe risks shipping liquid high-level radioactive waste would represent.

Thank you for your consideration of my comments.

Sincerely,

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and Board Member, Don't Waste Michigan, representing the Kalamazoo chapter

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State of Nevada, Agency for Nuclear Projects, Nuclear Waste Transportation Risks studies and reports, for CNSC's careful consideration (in reverse chronological order):

Friday, November 21, 2008

- ***State of Nevada*** - Potential Consequences of a Successful Sabotage Attack on a Spent Fuel Shipping Container - Radioactive Waste Management Associates (pdf-2.69M)

  http://www.state.nv.us/nucwaste/news2008/pdf/rwma0810sabotage.pdf

Thursday, March 06, 2008

- ***State of Nevada*** - Assessing the Vulnerability of Yucca Mountain Shipments: A Threat Matrix for Human-Initiated Events, Paper presented at the Waste Management 2008 Conference in Phoenix, AZ (February 24 - 28, 2008) - J.D. Ballard, PhD, et.al (pdf-587K)

  http://www.state.nv.us/nucwaste/news2008/pdf/wm2008ballard.pdf

Monday, January 07, 2008

State of Nevada - Planning for an Unpredictable Event: Vulnerability and Consequence Reassessment of Attacks on Spent Fuel Shipments (paper presented at WM 2005, the 32nd annual Waste Management Symposium, in Tucson, Arizona, on March 2, 2005) (pdf-344K)

http://www.state.nv.us/nucwaste/news2008/pdf/WM05_terrorism.pdf

Wednesday, January 31, 2007

- ***ESRA Consulting Corporation*** - After September 11th: Risk Assessment of Native American Pueblos and Tribes of New Mexico on the Impacts of the Waste Isolation Pilot Plant and its Transuranic Nuclear Waste Transportation Routes - Presentation to the Transportation Research Board of The National Academy of Sciences, TRB 86th Annual Meeting, Washington, D.C.,23 January 2007 - Sandy H. Straus (pdf-2.90M)

  http://www.state.nv.us/nucwaste/news2007/pdf/esra070123trb.pdf

  [Please note: this particular report does not address high-level radioactive waste, or irradiated nuclear fuel, *per se*, but rather so-called "low" level radioactive waste -- TRU (transuranic contaminated military wastes, including plutonium) -- but it does provide insights into risks, even for rural areas, such as Native American reservations, from such radioactive waste

shipments. And besides, TRU, despite being arbitrarily labeled "low" level radioactive waste, carries significant radiological hazard.]

Tuesday, January 03, 2006

- ***State of Nevada*** - State of Nevada Comments on NRC's Draft Report on Spent Fuel Transportation Package Response to the Baltimore Tunnel Fire Scenario (NUREG/CR-6886, PNNL-15313) (pdf-65K)

  http://www.state.nv.us/nucwaste/news2005/pdf/nv051230nrc.pdf

  [This letter refers to a real world train tunnel fire, under downtown Baltimore, Maryland, USA, in July 2001. This real world accident revealed -- according to a Nevada-commissioned study (see below) -- that high-level radioactive waste shipping containers would likely have failed, and released disastrous amounts of hazardous radioactivity, had they been on that train. And that train tunnel had, in fact, been targeted by US Department of Energy for Yucca Mountain, Nevada-bound rail shipments of irradiated nuclear fuel, as from Calvert Cliffs nuclear power plant in Maryland.]

Friday, May 20, 2005

- ***State of Nevada*** - Measures of Community Impact for The Transportation of Hazardous Materials: The Case of Indian Tribes and High-Level Nuclear Waste -- Conference Paper - Waste Management 2005 - Fred Dilger, Robert Halstead, James David Ballard (pdf-1.24M)

  http://www.state.nv.us/nucwaste/news2005/wm/native_american.pdf

- ***State of Nevada*** - Planning for an Unpredictable Event: Vulnerability and Consequence Reassessment of Attacks on Spent Fuel Shipments -- Conference Paper - Waste Management 2005 - Robert Halstead, James David Ballard, Fred Dilger (pdf-336K)

  http://www.state.nv.us/nucwaste/news2005/wm/terrorism.pdf

Tuesday, March 18, 2003

- ***State of Nevada*** - Radiological Impacts of Incident-Free Transportation to Yucca Mountain: Collective and Maximally Exposed Individual Doses - Paper

presented at the Health Physics' Society Annual Meeting, June 2002 (pdf-472K)

http://www.state.nv.us/nucwaste/news2003/pdf/HPSPaper-FEISImpactsCritique6-20-02.pdf

[Please note: even liquid high-level radioactive waste shipments not involved in an accident or attack, can still have radiological impacts on people -- due to the gamma and neutron radiation coming off of/being emitted by them. As Lauren Olson has put it, shipments of high-level radioactive waste are like "Mobile X-ray machines that can't be turned off."

In addition to the gamma and neutron radiation being emitted through the radiation shielding of the transport container, there is also the risk that shipping containers can become externally contaminated, delivering even higher radiation doses to persons at close range. In France, for example, in the mid- to late-1990s, it was revealed by activists and investigative journalists that 1/4 to 1/3 of ALL shipments going into the La Hague reprocessing facility were externally contaminated; many times, the contaminated shipments emitted 500X the “permissible” radiation dose; one emitted 3,000X the “permissible” dose. “Permissible” does not mean safe; it merely refers to the regulatory limit.]

Tuesday, March 04, 2003

- ***State of Nevada and Clark County -- Waste Management 2003***
  -- Implications of the Baltimore Rail Tunnel Fire for Full-Scale Testing of Shipping Casks - Robert J. Halstead, Fred Dilger (pdf-52K)

  http://www.state.nv.us/nucwaste/news2003/pdf/nv030225a.pdf

  -- How Many Did You Say? Historical and Projected Spent Nuclear Fuel Shipments in the United States, 1964-2048 - Robert J. Halstead, Fred Dilger (pdf-52K)

  http://www.state.nv.us/nucwaste/news2003/pdf/nv030225b.pdf

  -- Slides: Implications of the Baltimore Rail Tunnel Fire for .Full-Scale Testing of Shipping Casks - Robert J. Halstead, Fred Dilger (pdf-106K)

  http://www.state.nv.us/nucwaste/news2003/pdf/nv030225c.pdf

[As mentioned above, these studies shine more light on the lessons to be learned from the Baltimore train tunnel fire of July 2001. Also, the "How Many Did You Say?" report provides perspective on the 2,500 to 3,000 shipments that have occurred in the U.S. from the 1960s till recent years, compared to what would come under such a program as the Yucca dump -- many thousands (if mostly by rail) to tens of thousands (if done by legal weight truck) shipments, over decades. The relevance to the liquid high-level radioactive waste shipments proposed here is that they are unprecedented. That is, no such shipments have ever occurred, neither in the U.S. nor Canada. Thus, they represent uncharted territory. Any claims of thousands of safe shipments in the past – already false, as shown below – are not apt, for no such shipments of liquid high-level radioactive waste have ever taken place, so comparisons to previous shipments of solid high-level radioactive waste are not appropriate.]

Wednesday, February 13, 2002

- ***RWMA*** - Worst Case Credible Nuclear Transportation Accidents: Analysis for Urban and Rural Nevada - Matthew Lamb, Marvin Resnikoff, Ph.D. and Richard Moore, P.E. (pdf-3.59KB)

  http://www.state.nv.us/nucwaste/trans/rwma0108.pdf

Tuesday, November 06, 2001

- ***State of Nevada*** - Letter from Gov. Guinn to Sen. Reid, re: report entitled, ''Radiological Consequences of Severe Rail Accidents Involving Spent Nuclear Fuel Shipments to Yucca Mountain: Hypothetical Baltimore Rail Tunnel Fire Involving Spent Nuclear Fuel''

  http://www.state.nv.us/nucwaste/news2001/nn11458.htm

- ***State of Nevada*** - Radiological Consequences Of Severe Rail Accidents Involving Spent Nuclear Fuel Shipments To Yucca Mountain: Hypothetical Baltimore Rail Tunnel Fire Involving SNF

Thursday, July 12, 2001

- ***State of Nevada*** - Risky Transit -- The Federal Government's Risky and Unnecessary Plan to Ship Spent Nuclear Fuel and Highly Radioactive Waste on The Nation's Highways and Rail Roads (pdf-971KB)

  http://www.state.nv.us/nucwaste/news2001/nn11459.pdf

Tuesday, May 01, 2001

- ***State of Nevada*** - State of Nevada Evaluation of DOE's July, 1998 Shipment of Foreign Research Reactor Spent Nuclear Fuel through Northern Nevada; After Action Report (pdf-68KB)

  http://www.state.nv.us/nucwaste/news2001/nn11180.pdf

January 31, 2000

· ***State of Nevada*** - Additional State of Nevada Comments to the NRC on Nevada's Petition for Rulemaking with Respect to Safeguards for Spent Fuel and HLW Shipments

http://www.state.nv.us/nucwaste/news2000/nn10472.htm

December 8, 1999

· ***State of Nevada*** - Comments of Robert J. Halstead on Behalf of The State Of Nevada Agency For Nuclear Projects Regarding The U.S. Nuclear Regulatory Commission Study Assessing Risks of Spent Nuclear Fuel Transportation Accidents (Modal Study Update)

http://www.state.nv.us/nucwaste/news/nwpo991208a.htm

June 24, 1999

· ***State of Nevada*** - Governor and Attorney General Seek Tougher Protections Against Nuclear Waste Terrorism

http://www.state.nv.us/nucwaste/news/nwpo990624.htm

June 22, 1999

· ***State of Nevada*** - Letter to Dr. Shirley Ann Jackson Re: Nevada's Petition To Institute Rulemaking To Amend Regulations Governing Safeguards for Shipments of Spent Nuclear Fuel (SNF) Against Sabotage and Terrorism and To Initiate A Comprehensive Assessment

http://www.state.nv.us/nucwaste/news/ag990622a.htm

June 22, 1999

· ***State of Nevada*** - Petition To Institute Rulemaking And To Initiate A Comprehensive Assessment

http://www.state.nv.us/nucwaste/news/ag990622b.htm

May 20, 1999

· ***State of Nevada*** - Fact Sheet: Transportation of Spent Nuclear Fuel and High-Level Radioactive Waste to a Repository

http://www.state.nv.us/nucwaste/trans/trfact03.htm

May 6, 1996

- ***State of Nevada*** - Reported Incidents Involving Spent Nuclear Fuel Shipments 1949 to Present

  http://www.state.nv.us/nucwaste/trans/nucinc01.htm

[Please note: this report, by Robert Halstead, now head of the Nevada Agency for Nuclear Projects, shows that in fact there have been accidents and incidents, including radiological releases beyond the vehicle, in high-level radioactive waste shipments from 1949 to the mid-1990s in the U.S.

Dr. Marvin Resnikoff documented a number of these. As I myself wrote in a fact sheet (entitled "A Brief History of Irradiated Nuclear Fuel Shipments: Atomic Waste Transport 'Incidents' and Accidents the Nuclear Power Industry Doesn't Want You

to Know About," dated May 16, 2002, posted online at: http://www.nirs.org/radwaste/hlwtransport/accidentshistorybrochure.pdf), referring to the Halstead report cited just above:

'…Upon closer examination, though, innocent enough sounding "incidents" are actually quite significant. An 8/25/1980 incident is reported as "surface contamination on cask," but there's much more to the story, as Dr. Marvin Resnikoff revealed in his classic 1983 book The Next Nuclear Gamble: Transportation and Storage of Nuclear Waste...

A NAC-1 truck cask (a Nuclear Assurance Corporation container capable of shipping one irradiated fuel assembly) was delivered to the San Onofre nuclear plant in California on August 20, 1980. Unknown to the workers about to handle the cask at San Onofre, this cask had been used four months earlier to ship a leaking fuel assembly from the Oyster Creek, NJ nuclear plant to a research facility near Columbus, Ohio. The cask had become so severely contaminated in the process that NAC added external lead shielding, to try to lower the exposure to workers and the public from the harmful radiation doses being given off.

When the *empty* cask arrived at San Onofre, the radiation level in the truck driver's cab was over twice the maximum emitted 11 to 40 times the legal limit of radiation. A San Onofre health physics technician assisted – his role, to safeguard the workers' health against harmful radioactivity. However, U.S. Nuclear Regulatory Commission (NRC) documents reveal that the technician was not qualified for this particular task: "He had no familiarity with irradiated (spent) fuel casks," and "he received no briefing or instruction with regard to the potential hazard" of working with this contaminated cask nor even "what procedure or actions were going to be performed."

The NAC technicians opened a capped pipe leading to the interior of the cask. Highly contaminated water began pouring out. One NAC worker caught it in a plastic bag and measured the radiation. The water emitted up to 100 rems/hour of radiation, a level high enough to deliver a lethal dose to an adult after just five hours of whole-body exposure. Shorter exposure time to such intense radiation can also lead to other forms of severe health and genetic damage. The NAC workers used a paper towel to wipe up moisture in the pipe. The paper towel then gave off an even higher 300 rems/hr. One NAC worker attempted to place the plastic bags filled with contaminated waste into a shielded container. When it wouldn't fit, "he held his breath, turned his head, pushed the bags into the cavity while puncturing them with a screwdriver". No standard air samples were taken, and no proper respiratory safety equipment was used. NRC later fined San Onofre $125,000 for lax health physics supervision. Water samples showed that contamination was so high that the release of several gallons of water from this cask could have resulted in billions of dollars in clean up costs.

The very same NAC-1 cask later exceeded its radioactive decay heat temperature limit, had a leaking valve, and had a radioactive "hot spot" that mysteriously moved from one end of the cask to the other *after* it had been decontaminated several times.

In Feb., 1981 another NAC-1 cask at Oyster Creek was found to have surface contamination, even though it was empty and had not shipped fuel for five months. A layer of heavy paint was applied to hold the contamination in place during the cask's next journey, to Ohio. However, water soluble paint was used. It began to dissolve during a rain storm in Pennsylvania. The drivers noticed the paint peeling off, but continued on, apparently oblivious that radioactive contaminants were probably falling off onto the highway for hundreds of miles. How much radiation was released will never be known. NAC took 5 days to report the incident to NRC, which then took no action anyway.

High surface contamination incidents continued. Casks arrived at the La Crosse, WI nuclear plant with radiation levels 90 times the legal limit. NRC allowed the casks to be used, merely requiring them to *be wrapped in a large plastic bag*. Only *after* the shipments were completed did NRC require the casks to be decontaminated. Unfortunately, the La Crosse management did not warn their workers about the cask, and several were contaminated when they handled it without gloves. The NRC reported thatin less than a year, this particular cask had excess surface contamination 7 times, and released some radiation during transit.

NAC also had used faulty casks for more than 5 years, from 1974 to 1979, to ship irradiated fuel more than 300,000 miles. The casks bowed out of shape, a defect that NRC noted could compromise its crashworthiness. However, NAC only reported bowing problems after shipments had been completed. Eventually, 4 of 6 NAC-1's were pulled from the road due to the bowing problem. The NAC-1 had been regarded as the "workhorse" of irradiated fuel transport in the U.S. before its problems surfaced…'.

Given the fact that a NAC-LWT cask is proposed for this very risky shipping scheme involving liquid high-level radioactive waste, and the documented problems with NAC casks over the years and decades, it is all the more incumbent for CNSC to carefully consider the environmental impacts of this proposal. Full public hearings and an extended public comment opportunity should be allowed.

And there have been more high-level radioactive waste shipping incidents since those documented by Halstead and Resnikoff mentioned above. For example, high-level radioactive waste trans-shipments, from other Carolina Power and Light reactors, into the Shearon Harris nuclear power plant's storage pool in North Carolina, were jumped by escaping prisoners. The escaped prisoners jumped on

board the train, then jumped back off and fled after encountering train personnel. It showed how vulnerable these shipments are, that they could be jumped by escaped prisoners in the first place. They are very vulnerable to terrorist attack or sabotage, as Nevada has shown for two decades now.]